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The American Veterinary Medical Association

BY

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APRIL, 1916.

No. 1.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary C. M. Haring, University of California, Berkeley, California. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

WHY JOIN THE A. V. M. A.?

We have occasionally received letters relative to joining the A. V. M. A. Exceptionally the question is hinted at on a commercial basis: what is there in it for us in return for our initiation fees and annual dues? What of value is there in membership in any fraternal, religious or insurance organization where expenditure is involved? The underlying principle is the same in these as in a professional organization—an interest in something outside of one's self, an interest in one's profession and fellow man.

We may conceive, however, that there are some people who would prefer to buy a book of sermons and read them rather than go to church and bear their share of its support. This would impose a tax on the religious spirit. A tax would be imposed upon the dramatic spirit if some preferred to procure a copy of the play to read rather than to see it performed at the theater. A tax would similarly be imposed upon the professional spirit if any number of the members preferred merely to read the printed transactions of the organization's activities rather than to take part in them.

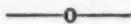
Money is essential in the support of any organization, but it is not the only essential. Above money is purpose, high ideals, and

a desire for the betterment of conditions that can be improved. The financial factor is necessary in carrying them out but it ought not to obscure them.

In working for the advancement of common interests no organization has probably made extensive progress, without at some time or other along its course, having made blunders of a more or less serious nature. Not to have done so would have required super-human qualities. To err is human; to emphasize the blunders and forget the worthy motive which inspired the effort retards rather than promotes progress.

We believe that the majority of the veterinary profession of this country has high ideals. We believe that, aside from his own personal activities, the progressive veterinarian has an interest in his profession and desires that it shall attain as high a rank in the minds of the public as any other profession; that commercialism does not overshadow his ideals; that he is not imbued with the idea that he lives for himself alone but is ready and willing to contribute to the good of others; that greater and more substantial gains can be made toward these ideals by working in mass formation than as isolated individuals.

P. A. F.



THE MAN BEHIND THE GUN

The past two years have been epoch making in the history of the veterinary profession in the United States. During this time the profession has grappled with, and successfully combated, in spite of the opposition of ignorance, one of the great animal plagues of the world.

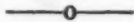
There are relatively few outside of the veterinary profession who realize what the eradication of this plague means to the livestock industry of America, and the welfare of the people. In dealing with such a plague as this, it is natural and proper that the Bureau of Animal Industry, and the state veterinary authorities should receive a good deal of publicity, and much credit for the excellent results accomplished. A great deal of credit is also due to the profession as a whole.

We want to commend the splendid stand taken by the veterinarians in private practice who have been true to the high ideals of our profession. In those regions where foot-and-mouth disease

prevailed the sacrifices made by the private practitioners have been great—they have given their services freely; they have been compelled to neglect their practice, and in a number of instances their practice has been ruined because of the efforts they have made, not only to assist the authorities, but by their own individual efforts to stamp out the disease. Some day in the not distant future, when the stockmen realize what the veterinarian has done for them, those who have been loudest in their condemnation will rise up and call the veterinarian blessed.

We believe that both the federal and state authorities appreciate the cordial support given them by the profession as a whole. It is a credit to the profession that only a very few veterinarians have crucified their ideals for a few pieces of silver, the ninety and nine have been loyal in the great battle. It is to this every-day practicing veterinarian "bumping the country roads", who has had no champion in the public press, that we wish to pay a feeble, but just tribute for the service he has so freely and efficiently given in this crisis, and for the professional ideals he has upheld.

N. S. M.



THE JOURNAL FOR THE PROFESSION

Not long ago a prominent veterinarian asked us seriously if it was planned to publish anything in the *Journal* besides the material pertaining to the American Veterinary Medical Association. The thought has occurred to us that if one so prominent might take this view of the situation there might be others. In our first editorial in the November number we stated "there must be space for contributions if the periodical is to be a *Journal* in fact as well as name", and that we wished to "have a sufficient variety of articles of timely interest to appeal to the progressive practitioner, who, after all, is the bulwark of the profession"; and again that "for community of interest there must also be due consideration for the ordinary and every day affairs that touch all practitioners".

We reiterate the sentiment. We do not regard the A. V. M. A. as a body outside of the profession but of it and in it for the best interests of all veterinarians whether members or not. We wish to reach all who are interested in the progress of the profession (and if there are any who are not, we wish to reach them too and, if possible, get them interested). The reaching out process cannot

be confined to the efforts of any one individual, it needs the co-operation of many and especially those on the firing line. There are, perhaps, various methods of cooperation but that which appears to us most effective is for each veterinarian to feel a partial responsibility and ownership of the *Journal* and contribute to it case reports or some of the experiences which have been of interest in a clinical or practical way and which will therefore probably interest other practitioners.

The association is not for itself alone, it is for the profession and the *Journal* as its official organ must of necessity be for the profession also. If erroneous ideas have been or are held on this subject we trust that each reader will do his share in dissipating them.

P. A. F.

VETERINARY SERVICE IN THE ARMY

If the present legislation increases the Cavalry and Field Artillery there will be needed two veterinarians for each new regiment of Cavalry and Artillery. Veterinarians who wish to enter this regimental service will have to pass an examination in the regular subjects taught in veterinary colleges and high schools, and in equitation. Antecedents and moral character will have to be excellent.

Also, if the present Army Veterinary Bill passes both Houses, it is proposed that another bill be enacted to form a Veterinary Reserve Corps on the same lines as the Medical Reserve Corps which accepts medical men who pass a prescribed examination and who are then subject for duty whenever called upon. Immediately they are put on duty they assume the position of an army officer in the Medical Corps and receive the rank, pay and allowances to which they are entitled.

Failing the passage of the Army Veterinary Bill it is proposed that a committee of members of the American Veterinary Medical Association be formed for the purpose of collecting the names of veterinarians who offer to serve in case of war. The duties would be inspecting meat, hay, grain, horses, mules, and regular veterinary work at hospitals located at base and mobile depots behind and along the battle lines.

It is advised that only members of the A.V.M.A. will be accepted by the War Department, because it will give the preference to men

who belong to a credited and recognized organization that is in a position to vouch for each veterinarian accepted as a member.

Army veterinarians at present receive the pay and allowances of a Second Lieutenant of Cavalry, viz: \$1700 per year with house, light, fuel and \$150.00 per year if he buys a horse suitable for an officer's charger and \$50.00 more if he buys another horse, making \$200.00 per year for two horses. Every five years, up to 20 years, he gets an increase of 10 per cent of his pay.

He and his family receive free medical and dental services.

Veterinarians who wish to join the new regiments of Cavalry and Field Artillery that may be formed in the coming Army legislation, should send in their applications to the QUARTERMASTER GENERAL, U. S. ARMY, WASHINGTON, D. C., stating their special qualifications, etc.

Veterinarians who wish to enter the Veterinary Reserve Corps, should join the American Veterinary Medical Association, if they are not already members, as soon as possible. Then every member who desires can fill out a blank similar to the following and send it to Dr. R. VANS AGNEW, Fort Leavenworth, Kans.:

.....
1916
 Street.....
 Town..... State.....
 Married or single..... Age.....
 Preference of duties.....
 Knowledge of riding (good, poor, no).....
 Are you a member of the A. V. M. A.?.....
 Will you serve in the veterinary department in case of war?.....

 (Name)
 —o— R. V. A.

EUROPEAN CHRONICLES

Bois Jerome.

SWINE TUBERCULOSIS. The importance this affection has in relation to meat inspection is sufficient to explain the interest that it has promoted in many countries, where the trade or the consumption of swine is extensive. For this reason perhaps, from many foreign countries valuable communications have been produced although the literature on the subject may not be very fully sup-

plied, yet one can read interesting articles from the pen of Belgian, French, and German writers without neglecting those also from American investigators such as Mohler, Washburn, Moore, Dawson and others.

Mr. Chaussé, a French veterinarian, a great investigator of the subject of tuberculosis, has recently published in the *Annales de Pasteur Institute* (November and December, 1915) a long article on "Swine Tuberculosis and Comparative Pathology and Evolution," which is illustrated by a number of plates corresponding to the various parts under consideration.

In the first part the author presents the history of this affection as far as it has been observed and as cases have been recorded. Ostertag, Nocard, Moule, Volkel, Stubbs, Moore, Dawson and many others are receiving due credit for their observations, their opinions are discussed, and references are given to their publications.

Statistics are presented relating to the morbidity of tuberculosis among cattle and swine. In one table, the French abattoirs furnish the material for comparison with steers, bulls, cows, calves and pigs. In another, the proportion of meat condemned. In a third, other countries of Europe furnish the statistics: Belgium, Prussia, Germany, Luxemburg, Holland, Italy. From this recapitulation and comparison the author, who treats of his subject essentially because of investigating the disease comparatively in France, says in conclusion: this contagious affection prevails with less intensity in that country among both cattle and pigs, that tuberculosis is always more frequent in cows, that of calves being from 30 to 100 times rarer, and that swine hold a medium position, the disease being from 4 to 20 times less frequent than in cows.

The problem of the channels of entrance for infection in swine tuberculosis is considered under five chapters:: 1—entrance through the tonsils and cervical lymphatics, 2—by the intestines through the chyliferous vessels and the thoracic duct, 3—by the direct air passages or inhalation, 4—through the genital tract by castration. A fifth is also considered by the association of the first two, which is called the mixed channel.

Of these various tracts of entrance, the first and the fourth receive greater attention. For the first, already known to all veterinary meat inspectors by the cervical caseous glands, the author considers the condition of the maxillary, parotid, and retro-pharyngeal glands, giving and illustrating their aspects as well as their

characters according to their age. And then the lesions of the tonsils, the starting point of the process as pointed out by Strose in 1897, Mendoza in 1906, Mohler and Washburn in 1908. It is true that the tonsil lesions cannot always be detected, unless looked for by microscopic examination and then it may be necessary to make them most minutely.

These lesions are then described and illustrated by quite a number of microphotographs showing sub-tonsil and intra-tonsil tubercle.

"The lesions of the tonsils have an important pathogenic significance, they are the first step of the infection although not the most visible. The second step being that of generalization."

The knowledge of this generalization is the basis of inspection in swine or bovine tuberculosis. In the former it is easier to define and recognize than in the second.

Chaussé then gives the characters of the recent, beginning and very slight generalization. One where the infection has taken place about 30 or 40 days before. After 50 or 60 days the generalization is at the second degree, the third being generally detectable after about 3 or 4 months, and then is followed by a fourth degree corresponding to the initial bacilleemia dating six months or more or to some repeated, more recent and varying in number, and in which lesions can be found in almost all parts of the animal.

After alluding to the intestinal entrance, to the tonsil and intestinal, to direct infection by the air passages, the author arrives at the fifth or the entrance through the genitals or by castration.

It is mentioned by the Germans, but seems to be unobserved in France. It is recognized by its seat, the testicular region, where there are marked lesions with characters older than those of the viscera.

There are subcutaneous tubercles at or in the tissues of cicatrization, hard, small, caseo-calcareous. The surrounding lymphatic glands are involved. In that form of tuberculosis, the cervical and mesenteric glands are not tuberculized, but the inguinal and iliac are. In the generalization of tuberculosis by castration, the lesions are much the same as those of cervical origin.

This long consideration relating to the lesions is followed by their histological study and principally those of the lungs, when the entire subject is brought to an end by a general comparison between swine tuberculosis and that of other species, especially from the point of view of the pathology and following conclusions.

Knowing the histological differences of the pulmonary lesions existing between swine and bovine tuberculosis and also those of the maxillary lymphatic glands, there are interesting peculiarities to observe.

The lung, liver and spleen characterize swine tuberculosis the best, and this simultaneously as soon as the infection is somewhat severe.

In swine, the tuberculous virus has very little affinity for the kidneys and renal lesions are very rare.

Yet with swine, the receptivity of the organism for the virus seems to be the greatest, no encysted lesions are found as there are in man or bovines.

Generalization is in swine, the rule, at the most a few months is required after the infection.

Peripheral glandular lesions and tubercles of the bones are peculiarly frequent in swine, if they lived long enough. Then most of them would be affected with extensive lesions of the vertebral column.

With swine there is no retrogression with the tubercle, no fibrous transformation: it seems as if with them the disease process always progresses. In general caseination always takes place early.

In swine all the tissues are good for cultures of the virus, more than in other animals, with the exception, however, of the kidneys. They represent an organism which does not create occult lesions with bacilli having a normal virulency.

Properly speaking, swine are not infected through the digestive canal, the entrance of the virus takes place most often through the tonsils and very likely the inoculation is the result of traumatism.

Finally let us notice how tuberculous conditions, no matter what the channel of entrance, are much alike in their various steps of development. Indeed tuberculosis by bucco-pharyngeal entrance as in swine is pathologically identical with primitive intestinal tuberculosis. The latter does not probably ever penetrate by Peyer's patches and the closed follicles which are the true intestinal tonsils.

For us, says Chaussé, the same passive etiological condition exists in the pharynx and in the intestines; the cause of which is the accidental presence of the bacillus in the lymphatic follicles.

In résumé: swine tuberculosis is the type of tuberculosis of bucco-pharyngeal origin as comparatively human and bovine are generally types of tuberculosis by inhalation.

INTRA-PALPEBRAL MALLEIN TEST. Inaugurated in Italy, where Prof. Lanfranchi applied it first, this method to diagnose glanders has traveled all over the world. French, German, Italian and American veterinarians and observers have experimented with it and have shown whatever weak points there were in it, if it had any, and have recorded the good results that have been obtained. Thousands of animals have been submitted to its effects; many have been confirmed as glanderous and condemned as such by it and their post-mortems established and proved the correctness of the verdict rendered. Large areas have been cleared of the disease and healthy and sound horses saved from the terrible contagion and to-day in the *Journal of Comparative Pathology and Therapeutics* for December, 1915, Captain Goodall of the South African Veterinary Corps gives a long, magnificent record of the task which he had to carry out when called to solve the problem of finding glandered horses among those suffering from septic pneumonia, strangles, catarrh, etc., whose temperatures were most irregular and which could not be tested by the ordinary subcutaneous method.

First, the captain resorted to the method by instillation of undiluted mallein in the conjunctiva and he obtained fairly good results, but as there were many drawbacks to its use, he fell back on the intrapalpebral test, modifying slightly the original method in the preparation of the mallein and injecting only one-fifth of the concentrated mallein as a dose.

The technic of the operation is described and is about the same as usual, the characters of the ocular reaction are given and illustrated and the classification is offered of the local reactions according to their degree of intensity.

For instance, for *positive reactions* (XXX) (a) indicates as symptoms, intense swelling of the eyelid, infiltration of the surrounding subcutaneous tissue, with complete or almost complete closing of the eye and a copious discharge of muco-purulent material from the inner canthus, accompanied with marked conjunctivitis.

(XX) (b) means as reaction, a marked swelling of the eyelid, extending to the cheek, discharge of muco-purulent material, but only partial occlusion of the eye. Marked conjunctivitis.

(X) (c) indicates the presence of swollen eyelid persisting for forty-eight hours, with discharge of muco-purulent material but only slight, if any swelling of the surrounding tissue. Marked conjunctivitis.

Doubtful reaction: (?) (d). Swelling of the eyelid persisting for forty-eight hours, with no other symptoms and no discharge of muco-purulent material or any collection of it in the canthus.

Negative reaction: (e). No swelling of the eyelid after forty-eight hours and no muco-purulent discharge.

It is with this classification that after a few remarks on the characters of the swelling, of the muco-purulent discharge and its microscopic examination, of its post-mortem appearances and duration, that Captain Goodall gives a condensed résumé of the results obtained from a number of horses tested and condemned by the intrapalpebral method.

This record is very interesting, the subjects having been collected into five groups, each presenting a specific condition.

In group No. 1, the *clinical cases* were gathered. Six animals tested. Five gave positive reactions. One was negative.

Group No. 2. On *animals which had previously given a thermal and local reaction to the subcutaneous mallein test*. Seven animals. All gave positive reactions.

In group No. 3 were the *animals that had given a previous doubtful reaction to the subcutaneous test*. Seven animals operated upon. Six were positive. One doubtful had, at post-mortem, one well defined lesion the size of a pea, in the lung.

Again in group No. 4 were animals which had given a *doubtful reaction to the subcutaneous test*. Four positive results out of four subjects tested.

Group No. 5. *Animals which had failed to react to the subcutaneous method*. Nine records are given. Eight gave positive reactions. One was doubtful but developed clinical glanders fourteen days later.

In group No. 6 were considered *animals which had not been previously tested by any other method*. Twelve horses were condemned by positive reaction.

In group No. 7, seven horses which had been tested by the subcutaneous method and had given reactions and were tested with the palpebral method. Three gave positive results. Four were negative.

In group No. 8 were presented animals tested *simultaneously by subcutaneous and intra-palpebral methods*. Seven tested, seven positive.

Group No. 9. Three horses which had *reacted to the intra-palpebral test were 24, 48, and 72 hours after reinjected* in the other eye. They all gave another reaction twenty-four hours after a previous injection.

The presentation of each of these groups is closed with remarks and conclusions referring to each and form a basis for the general conclusions summarized as follows: "The intra-palpebral test is a safe and reliable method to use in the diagnosis of glanders and its certain advantages distinct over the classical subcutaneous method are briefly summarized below:

1. Clinical cases give constant reaction with this method.
2. Animals which have given double reactions with the subcutaneous method react with the palpebral even during the height of the subcutaneous temperature curve.
3. Doubtful reaction to the subcutaneous test can be retested by this method and give reaction immediately afterwards.
4. Certain animals which have failed to react to the subcutaneous test react to this method.
5. Animals which could not be tested by the subcutaneous method, on account of other disease and high temperature, can be tested by this method and react as glanders.
6. A safe diagnosis can be made on the local reaction alone, which cannot be done with the subcutaneous method.
7. The local reaction is more delicate than the subcutaneous one and more easily interpreted. Doubtful local reactions are extremely rare.
8. In ordinary cases, one can obtain temperature, local and ophthalmic reactions by one injection.
9. Mules react to this test as horses, (which has not been the case in the experience of the author with the subcutaneous method.)"

These conclusions end by statistics which speak for themselves on the value of the method which is the object of this good publication: "Over 1400 animals have now been tested by the intrapalpebral method as described and so far no failures can be recorded."

A. LIAUTARD.

EFFECTS OF FEEDING COTTON SEED AND ITS PRODUCTS TO SWINE*

G. A. ROBERTS

North Carolina Experiment Station, West Raleigh, N. C.

This paper is not intended to be a complete treatise upon the subject of feeding cotton seed or cottonseed meal to swine, but rather a digest of the work and conclusions of the North Carolina Experiment Station during the past six years of investigation, by the animal husbandry, the chemical and veterinary divisions of the station.

Cotton seed, at one time considered a worthless by-product, has become a most valuable product, not only in the South but in many parts of the world. Its use as a rich source of protein for feeding animals has been recognized for a number of years. It has also been known for some time that the feeding of cottonseed meal to swine for more than a few weeks at a time often resulted in the death of the swine. Other animals, especially calves, sometimes show ill effects from it.

The interest and importance of this subject may be judged from the large number of stations and individuals carrying on experiments along this line during the past twenty-five years. With the hopes of determining the exact cause for the ill results, the change in the body tissues and a remedy for same, this station undertook to do so through its animal husbandry, chemical and pathological divisions.

The animal husbandry division provided the animals, the quarters, the unprepared feeds, and did the feeding except where forced feeding and intraperitoneal injections were made.

Some twenty (20) calves were furnished, two hundred eleven (211) swine, five or six hundred (500-600) guinea pigs and a like number of rabbits (Belgian hares). Both of the latter are very susceptible to cottonseed meal poisoning, death occurring in from six to twenty-two days feeding, average of thirteen days in these animals. These smaller animals were used for the preliminary feeding for economy of time and animals. The earliest death we had in swine was thirty days, one was discontinued after two hundred

*Presented at the meeting of the A. V. M. A., Section on Practice, Oakland, Cal., September, 1915.

and twenty-six days, but usually death occurred in from fifty to eighty days. Three calves died in from seventy-one to two hundred and eighty days.

The poultry division also fed some cottonseed meal and its products to fowls with fatal results.

The chemical division prepared the modified cotton seed and cottonseed meal to be fed and made the necessary chemical analysis. In all, this division prepared three hundred and thirty-five feeds, most of which differed in quality or quantity, though a few were duplicates—as when the same feed was fed to different classes of animals.

Among the various feeds prepared may be mentioned the following: lint, hulls, oil, decorticated kernels and meal (new, old, cooked, fermented naturally and by yeast, and digested with pepsin and pancreatin.) Extracts were made with water cold and hot, lime water, acetic, hydrochloric, and sulphuric acids; watery solutions of sodium chloride, ammonium citrate and potassium hydroxide; ether, chloroform, alcohol, etc. In an attempt to find an antidote, iron salts, ashes, lime, etc. were added to the meal.

The interesting factors determined by these feeds show conclusively that the substance of gossypol is very toxic and that iron salts, ashes, etc., act as partial antidotes.

Gossypol (gossypium-phenol) is found generally distributed throughout the cotton plant, even in the roots, but conspicuously in the seed. Here it is confined to little yellowish brown to black specks readily observed on cross-section of a kernel, especially with a hand lens. It is largely responsible for the yellow color of the meal.

The chemical division found that this substance was much more readily obtained from the decorticated seed than the meal. While several solvents were available their method of securing it was to remove the oil from ground up kernels with petroleum ether then extract again with ethyl ether. After evaporation a red resinous material of peculiar pungent odor amounting to about 2.5% of the weight of kernels was obtained. This consisted of about one-half gossypol, estimated, and other undetermined substances. Further extraction with alcohol, following the ether, left a residue practically free from gossypol which was fed to rabbits six to eight times longer than average fatal periods without ill effects. Oxydized gossypol in filtrate obtained by boiling cottonseed meal with alcoholic caustic soda apparently is also non-toxic.

In comparing the efficiency of various antidotes sulphate of iron, ashes, etc., though not lime, enabled swine to feed much longer on cottonseed meal than without such. Cottonseed meal was fed from one-fourth to three pounds daily per one hundred pounds live weight, and the iron sulphate was added to it from one-fourth to one ounce per day. These agents did not always prove effective in preventing death but prolonged the period of safe feeding cottonseed meal greatly and in many cases appeared to be specifics.

The veterinary or pathological division undertook to make a close study of the clinical symptoms and the gross and microscopical lesions.

Some clinical or daily observations were made of nearly all the animals before mentioned.

Autopsies were conducted upon three calves, one hundred and sixty swine, including eighteen slaughter observations on swine receiving corrective agents (antidotes), some five hundred or more guinea pigs and a like number of rabbits.

It should be noted here that as in many other diseases the symptoms and lesions are not always characteristic; in some cases they were too slight to be noted and in others were marked clinical symptoms and gross lesions; some cases very acute and some very chronic.

CLINICAL OBSERVATIONS: Observations upon the living animals consisting in noting all evident symptoms of disease; on a number of swine the daily recording of pulse, temperature and respiration, and weekly examinations of blood.

General symptoms of cottonseed meal feeding: Among the more common symptoms in swine fed on cottonseed meal were noted: rather firm feces, though diarrhoea was occasionally present; rough, coarse hair, indicating unthriftiness, in chronic cases; irregularity or loss of appetite, especially for the cottonseed meal, weakness, lying down a great deal, unsteady gait, more or less blindness and in chronic cases, difficult jerky breathing, more pronounced in acute cases. Animals would finally get down unable to rise and would lie there either in a comatose condition or in a constant effort to regain their feet, often grunting as if in much pain. A few cases frothed violently at nose and mouth just preceding death. Death would follow in a few hours to several days. Many animals, however, that appeared hale and hearty at the evening meal were found dead the following morning. In two cases ap-

parently healthy hogs died suddenly when driven on scales to be weighed.

In rabbits and guinea pigs, the most conspicuous symptoms consisted of rapid breathing, lassitude, prostration, and death in a few hours.

TEMPERATURE, PULSE AND RESPIRATION: Swine are not very suitable animals for obtaining satisfactory records of temperature, pulse and respiration. In these observations, made upon some half dozen swine, the changes and irregularities were as great in the checks as in those fed cottonseed meal, to within a short time before death. A rapid, weak and often imperceptible pulse and difficult breathing were noted prior to death in a number of cases.

BLOOD EXAMINATIONS: Weekly blood examinations were made of a dozen or more swine and of several guinea pigs. The object was to determine the per cent of solids in the blood from week to week, the number of red and white corpuscles, per cent of hemoglobin and the differential leucocytic count. While some variations occurred in several instances, the variations in the check animals were about as well marked as in those feeding upon cottonseed meal. In some cases showing a chronic affection, with emaciation, there was a slight decrease in the hemoglobin but in no case was this a marked characteristic.

AUTOPSY EXAMINATIONS: The post-mortem examinations consisted in looking for all the gross lesions observable, making histological studies of various tissues and noting the weights of the principal internal organs.

GROSS LESIONS IN SWINE: Among the more common necropsy observations were found an excess of pleural and abdominal serous fluids, congestion, inflammation and edema of lungs, thrombi in heart, some congestion of heart, of liver, of kidneys, of stomach, of intestines and of lymph nodes,—congestion of internal organs in general, as noted by injected blood vessels. An excess of sand and gravel was found in the stomach and intestines, indicating a depraved appetite.

In rabbits and guinea pigs excess of abdominal fluid and congestion of abdominal organs were found more frequently and thrombi, edema of lungs and excess of pleural fluid were found less frequently than in swine.

In fifty necropsies upon swine the frequency of lesions were as follows:

Thrombi in heart.....	83%
Edema of lungs.....	84%
Excess pleural fluid.....	70%
Congestion of lymph nodes.....	66%
Excess abdominal fluid.....	46%

It is interesting to note that ante-mortem clots (thrombi) were not found upon autopsy in any of the nine hogs which received iron salts along with cottonseed meal.

The most frequent apparent cause for death in swine was edema of the lungs with which thrombi of the heart were often associated. In some cases, however, with edema present, no thrombus could be found. In other cases with marked thrombi no edema was found.

In fifty necropsies upon rabbits the following frequency of lesions was found:

Thrombi	52%
Edema of lungs.....	20%
Excess pleural fluid.....	28%
Excess abdominal fluid.....	72%

In necropsies on one hundred guinea pigs the following frequency of lesions was found:

Thrombi	18%
Edema of lungs.....	41%
Excess pleural fluid.....	18%
Excess abdominal fluid.....	64%

HISTOLOGICAL EXAMINATION OF TISSUES: Forty-two histological studies were made of tissues from swine as follows: six heart muscle, four aortae, seven lungs, seven livers, nine spleens, and nine kidneys. Eighteen sections consisting of seven spleens, all four aortae, three heart muscles, three lungs and one liver showed no microscopical lesions.

Among the twenty-four sections showing microscopical lesions, the following was observed:

Hyperaemia—Kidneys 66-2/3%, livers 86%.

Inflammation—Lungs 57%, kidneys 22%, heart muscle 16-2/3%.

Hemorrhage—Livers 57%, kidneys 22%, heart muscle 16-2/3%.

WEIGHTS OF INTERNAL ORGANS OF SWINE: Weights of internal organs were made and compared with the total weight of hog. In most cases there was some congestion of the internal organs and the relative weights were usually somewhat high, though varying within rather wide limits.

Of thirteen hogs the limits were as follows:

Livers varied from 1.87% to 4.50% of total weight

Spleens varied from 0.07% to 0.20% of total weight

Kidneys varied from . 0.28% to 0.80% of total weight

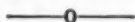
Hearts varied from . . 0.38% to 0.81% of total weight

Lungs varied from . . . 0.99% to 3.33% of total weight

CONCLUSIONS: While several agents before mentioned have proven efficient in prolonging the period of safe feeding of cottonseed meal no practical means for eliminating the toxic element, or elements, has as yet been developed.

The writer believes the effect of the above agents are purely chemical in rendering the gossypol, and possibly other toxic substances, non-toxic. He has noted with others that hogs having range and rooting a great deal, apparently gain minerals from the soil and forage which enables them to withstand the cottonseed meal longer than when confined, especially when on a board floor.

Since iron salts did not prevent all deaths and that a number of iron fed swine developed conspicuous rheumatic symptoms, the writer does not believe iron to be the logical antidote, but has hopes that a safe method of feeding the meal to swine will be discovered.



THE BACILLUS ENTERITIDIS AS THE CAUSE OF INFECTIOUS DIARRHEA IN CALVES*

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INTRODUCTION.

- I. Plan of Feeding Experiment.
- II. Course of the epidemic.
 - a. Discussion of the Clinical Symptoms.
 - b. Discussion of the Pathological Anatomy.
 - c. Discussion of the Bacteriologic Findings.
- III. Calf Feeding Experiments with Isolated Culture.
- IV. Discussion of the Outbreak from an Epidemiological Viewpoint.
- V. Discussions of Identity of *B. paracolon* with the *B. enteritidis* (Gärtner) and Meat Poisoning Organisms.
- VI. General Conclusions.

*From the Laboratories of the University of California. Presented at the meeting of the A. V. M. A., Section on Sanitary Science and Police, Oakland, Cal., September, 1915.

In the course of a feeding experiment on calves at the Agricultural Experiment Station of the University of California (under direction of C. L. R.), infectious diarrhea or scours in a severe form made its appearance. The writers were able to determine the etiology of this outbreak and to prove that the *B. paracolon* or *B. enteritidis* (Gärtner)¹ is also responsible for infectious diarrhea of calves in the United States. In view of the fact that scours has not been extensively studied in this country, we report today our findings.

I. THE PLAN OF THE FEEDING EXPERIMENT. The object of the feeding experiment was to determine what influences the feeding of alfalfa hay or grain had upon the health of young calves.

The procedure in this experiment was to allow the calves to run with their dams for four days; then to receive whole milk until ten days old, after which period there followed a reduction of whole milk at the rate of one pound per day and the addition of a like amount of skim milk until the calves were receiving all skim milk. In addition the lots were handled in separate pens as follows:

Lot I, consisting of four calves (Nos. 1220, 1222, 1228 and 1239), which received, beginning with the fifth day, alfalfa hay until thirty days old.

Lot II, consisting of five calves (Nos. 1241, 100, 1240, 1236 and 1237) which received, beginning with the fifth day, grain and alfalfa hay until thirty days old.

Lot III, consisting of five calves (Nos. 1215, 1216, 1217, 1218 and 1219) which received, beginning with the fifth day, grain until they were thirty days old.

The grain fed to Lots II and III consisted of rolled barley, three parts, whole oats, two parts, and bran, one part, by weight.

Lot IV-a consisted of five calves (1201, 1207, 1210, 1211 and 1213).

(1) The paratyphoid-enteritidis group of intestinal organisms can be separated serologically into two large groups (I and II.). Recent investigations have shown that the representatives of these groups can be further classified on account of their specific pathogenicity for man and animals. Various subgroups have been suggested, but in this paper the following simple classification is used:

I. Paratyphoid B. group:

- (1) Human paratyphoid B. bacilli.
- (2) Paratyphoid B. bacilli of calves, hogs, and foals.
- (3) Meat poisoning paratyphoid B. bacilli.

II. Enteritis (Gärtner) group:

- (1) *B. enteritidis* (Gärtner).—meat poisoning.
- (2) *Paracoli bacilli* of calves,

Lot IV-b consisted of five calves (1229, 1230, 1231, 1234 and 1235).

Lots IV-a and IV-b (10 animals) were cheek lots and they received until 30 days old no grain nor hay, but whole milk and skim milk as outlined for the other lots.

At the age of 30 days and until they were 90 days old the calves in all lots were to receive:

Skim milk 14 pounds per 100 pounds live weight

Grain mixture 1 pound per 100 pounds live weight

Alfalfa hay ad libitum.

The calves for this experiment were bought promiscuously from local dairies. The whole milk and skim milk were purchased from Berkeley and Oakland creameries and fed to the calves in a raw state. Bacteria counts made on these milks on three occasions showed an average count of 5,000,000 for the skim milk and 250,000 for the whole milk.

The experiment was continued until December 12th, 1914, when, on account of scours and deaths among the calves the feeding experiment was abandoned. The pens were scraped and disinfected and the milk pasteurized by heating with a steam hose to a temperature of 160°F., then allowed to stand for 30 minutes, after which it was rapidly cooled in the cans. After the disinfection of the pens and the pasteurization of the milk, only two new cases developed (Nos. 1235 and 1236), one of which (No. 1236) died. From the autopsies recorded below and from Table V it will be noticed that none of the lots escaped infection. Some of the calves were treated with various agents, but since others received no treatment and recovered, it is impossible to draw any conclusions relative to the efficacy of the agents used.

II. COURSE OF THE EPIDEMIC AMONG THE CALVES. 1. Nov. 2, 1914, calf 1207, lot IV-a, aged 39 days, was chloroformed; had been ailing for several days and had difficulty in breathing. Autopsy (J. T.) revealed neerobacillosis of the larynx.

2. Nov. 16, 1914, calf 1237, lot II, age 30 days, was found dead; decomposition had so far advanced that it made bacteriologic examination unsatisfactory. Diagnosis enteritis.

3. Nov. 21, 1914, calf 1222, lot I, age 57 days, was brought to the Veterinary Science Laboratory. The calf had been scouring since Nov. 19th; on Nov. 20th it had a temperature of 106.6; Nov. 21st the temperature was 106.3 and the animal was killed; autopsy

(J. T.) revealed carcass in poor condition, the tail and tissues surrounding the anus soiled with yellowish nauseating feces. The subcutaneous tissue of the right inguinal region showed a bloody effusion. The thoracic cavity, outside of a large number of small hemorrhages on the epicardium of the auricles and ventricles (probably due to mode of slaughter) and one hemorrhagic infarct in the lung, showed no apparent changes. The abdominal cavity proper showed nothing abnormal. The small intestine viewed from the serous surface showed dark bluish red discolorations. The stomach revealed no noteworthy alterations. The rumen contained about 7 pounds of hay. In the abomasum one large curd, rubber-like in consistency, was present. The entire length of the small intestines was reddened, thickened and hemorrhagic. The greatest portion showed a dark red discoloration. Bloody mucus and a slight amount of yellowish ingesta were contained in the small intestines. The mesenteric lymph nodes were very much enlarged and edematous; hemorrhages were present in the hilus; the large intestines were reddened, and the folds, especially on the ridges, showed linear and punctiform hemorrhages. The liver was enlarged and purplish in color. Gall bladder contained a turbid bile, but was not distended. Spleen was slightly enlarged. The kidneys showed no apparent changes. The bladder contained clear urine, but showed a few petechiae on the mucous membrane.

Cultures from the mesenteric lymph nodes, liver, spleen and gall-bladder showed a motile rod which fermented dextrose and mannit with production of acid and gas, but produced no changes in lactose and saccharose.

Nov. 22, 1914, $\frac{1}{2}$ c.c. of a 24 hour broth culture obtained from the gall-bladder was inoculated subcutaneously into guinea pig 102 and a 1 c.c. dose was given subcutaneously to rabbit No. 3. The guinea pig died 28-XI-14, showing swelling at point of inoculation, but no pus formation. Liver showed several irregular necrotic areas; spleen enlarged; lymph nodes, especially precrural and mesenteric, were enlarged and hemorrhagic. Cultures from heart blood and liver yielded the same organism as inoculated.

The rabbit had been losing weight and was found dead 2-XII-14. No autopsy was performed.

4. *Autopsy of Calf No. 1220 of Lot I*: Died on December 6, 1914; autopsied (K. F. M) on December 7, 1914. Rigor mortis was passed. The cadaver emaciated; the tail and tissues sur-

rounding the anus soiled with yellowish, fecal matter. The subcutis and muscles were rather dry and slightly icteric. The abdominal cavity contained a few c.c. of turbid fluid. The small and large intestines were edematous, deep bluish-red and filled with liquid, slimy, frothy, brownish blood-tinged contents. The mucous membranes were edematous, swollen and covered with bright streaks of red hemorrhages and small blood coagula. The lesions were most marked in the small intestines. The solitary follicles and Peyer's patches were very prominent; the submucosa and muscularis were infiltrated with yellowish exudate. The abomasum contained a casein clot and some hay material mixed with stringy slime. The mucosa was remarkably edematous, deeply folded and reddish gray. On and between the folds were superficial erosions and numerous petechiae; toward the duodenum the inflammation increased in intensity. In the duodenum a slimy bile-stained content covered the thickened and reddened mucous membrane. The mesentery showed distended lymph vessels and prominently enlarged lymph nodes. The nodes were soft, on section grayish, of a medullary appearance, with a few petechia. The spleen was about twice its normal size and its capsule tight. On section the follicles were slightly visible, the pulp soft and deep-brownish. The liver was noticeably enlarged, smooth, shiny, brownish-yellow. The parenchyma was indistinct and a few pin-head sized, grayish foci were noticed. The kidneys were swollen and showed small hemorrhages in the cortex. The lungs were deep red and only slightly collapsed; in the trachea and bronchi a slight blood-tinged mucus found. On the epicardium and pericardium there were a few petechiae. The myocardium was soft, turbid and grayish.

Pathologic-anatomical Diagnosis: Hemorrhagic gastro-enteritis; spleen tumor; acute lymphadenitis of the mesenteric lymph nodes; parenchymatous degeneration of the liver, kidneys and myocardium; focal necrosis in the liver.

Microscopic Examination: Liver: In sections of the liver, fixed and stained as usual, small foci of necrosis and fibrinous exudation were observed. Between the lobuli aggregations of large endothelial cells with slight round cell infiltration were noted. The liver cells showed cloudy swelling and some fatty infiltration.

Spleen: Similar necrosis and endothelial cell foci, as noted in the liver, were found in the pulp. These lesions were identical with the pseudotubercles quite recently studied and described by

Joest¹, so that a further detailed discussion of this observation was superfluous.

Bacteriologic Examination: Heart blood, spleen, liver, mesenteric lymph nodes, kidney and intestinal material were inoculated in bile lactose broth and incubated for 12 hours at 37°C. The cultures thus obtained were plated in Endo and modified litmus-lactose agar. The following findings were recorded:

Heart blood: Gram negative, non-lactose fermenting bacilli pure.

Spleen, Mesenteric Lymph, Liver: ditto; ditto; ditto.

Kidney: ditto; ditto; and a Gram positive coccus.

Jejunum and colon: Gram negative, non-lactose fermenting bacilli pure; cocci and a lactose fermenting bacillus.

The further study of these organisms identified the non-lactose fermenting bacillus as a *B. paracolon*.

5. *Autopsy of Calf No. 1240 of Lot II:* age 24 days; in agony; chloroformed Dec. 7, 1914, and autopsied (K. F. M.)

Pathologic anatomical findings were identical with those of Calf No. 1220. *B. enteritidis* isolated in pure culture from mesenteric lymph nodes, gall-bladder, heart blood and liver.

6. *Autopsy of Calf No. 1230 of Lot IV-b, check lot:* age 51 days old; autopsied (J. T.) December 9, 1914. Anatomical findings identical with those of calf No. 1220 and calf No. 1222. Cultures from heart blood, positive.

7. *Autopsy of Calf No. 100 of Lot II:* age 26 days; autopsied (J.T.) December 9, 1914. Cadaver decomposed; findings similar to those of calves Nos. 1220 and 1222.

8. *Autopsy of Calf No. 1211 of Lot IV-a, Check lot:* 87 days old; autopsied (J. T.) December 11, 1914.

Pathologic-anatomic findings identical with those of calves Nos. 1220 and 1222, excepting that the small intestines showed more blotchy red areas and liver showed many areas of focal necrosis.

Cultures from heart blood, spleen, liver, mesenteric lymph nodes and gall-bladder yielded *B. enteritidis*.

9. *Autopsy of Calf No. 1239 of Lot I:* 32 days old; autopsied (J. T.) December 15, 1914.

This animal was killed and the anatomical lesions were found to be identical with those of calves Nos. 1220 and 1222, excepting

(1) Ztsch. f. Infekt. Kr. der Haustiere, 1914, XV, p. 307-337.

that the large intestines were remarkably pale. Cultures from the spleen, liver, mesenteric lymph nodes and heart blood yielded *B. paracolon*.

10. *Calf No. 1236* died December 25, 1914, 42 days old, but was not autopsied; had been scouring since December 20, 1914 and on that day had a temperature of 105.5.

a. Discussion of the Clinical Symptoms: The records of the enzootic among the calves of the feeding experiment demonstrate that in a comparatively short interval out of a lot of 24 calves 8 succumbed to a disease resembling clinically infectious diarrhea (one dying later). At first the symptoms were not well recognized by the attendants, because an infectious cause was not suspected. In the late cases, however, the well marked course of symptoms, i. e. the depression and weakness of the calves; the inappetency and the rough, lusterless condition of the hair and coat attracted the attention of the observers. As a rule fever could be recorded at that time. In 24 to 48 hours afterward the brownish-yellowish feces, usually blood-tinged and of an exceedingly nauseating, repulsive odor, made their appearance. This condition would last several days, the animal showing gradual loss in flesh, and the abdomen being tucked up. Shortly before death the animals were mostly lying on one side, showing rapid respiration and localized muscle tremors. The temperatures were normal or subnormal, usually unsatisfactory on account of the paralysis of the sphincter ani.

In the fatal cases, with one exception, the animals died within three to five days, and as already mentioned, at least six calves visibly infected recovered. In a few cases the symptoms of intoxication were more marked than the diarrhea.

When comparing these observations with the accounts given by C. O. Jensen¹, J. Poels², Titze and Weichel³, etc., we recognized a similarity to the so-called Paracolibacillosis, so ably described by Jensen. The fact that the calves older than five days were attacked by the disease and that the course was a comparatively long one strongly suggested from the beginning that coli infection was not responsible for the deaths of the calves. The age incidence is apparently a great factor in the clinical diagnosis of calf scours; how-

(1) C. O. Jensen; Kälberruhr in Koue-Wassermann: Handbuch der Pathogenie Microorganismen, II Edit. 1913, VI, p. 126.

(2) Rapport over de Kalverziekte in Nederland, 1899.

(3) Arbeiten a. d. Kais. Gesundheitsamte, Bd. 33, Heft 3, 1910, p. 516.

ever, not to such an extent that a bacteriological examination would be made superfluous. Christiansen⁴ has summarized recently in a very able article on paracolibacillosis the statistics collected at the laboratories in Copenhagen, and he finds that 37.8% of the calves affected with paracolibacillosis were at an age of from 14 days to one month, 27% of one month of age or over and only 7% under 8 days of age. When calf scours occur in the early days of life, we are probably dealing with direct coli infections; in older animals paracolibacillosis is to be suspected. Infections due to organisms other than representatives of the paratyphoid-enteritidis group, like diplococci, pyocyanous and proteus, occur also in older calves and, therefore, without a bacteriological examination a definite diagnosis is not possible. The cases under discussion are a fair example of this condition.

b. Discussion of the Pathological Anatomy: The post-mortem findings can be considered as characteristic for a paracoli infection, inasmuch as intestinal lesions, accompanied by bacteremia, were present in every instance. The hemorrhagic inflammation of varying degrees was always associated with an exceedingly marked enlargement of the mesenteric lymph nodes. These nodes were at least twice the size of normal, very pale, soft edematous, and only in the cortical zones were a few hemorrhages seen. The septicemia condition was indicated by an acute spleen tumor; the organ was two or three times its normal size; the capsule was very tight and in some instances covered with petechiae and hemorrhages; the pulp was soft and hyperemic and the follicles were indistinct. In one specimen a few small necroses could be detected. The liver was always enlarged, of yellowish-brown color on section and at times showed numerous, grayish foci of necrosis. The general icterus present indicated the severe impairment of the liver. In the dark kidneys, numerous small petechiae in the cortex were present. In one animal the beginning of a hemorrhagic broncho-pneumonia was noted.

These findings correspond in every respect with those described by Thomassen, Jensen, Christiansen and others, and can be considered characteristic. However, when colibacillosis occurs in older calves the lesions resemble greatly those of paracolibacillosis and the diagnosis is difficult. The hemorrhagic diathesis on the spleen and

(4) Paracolibacillöse hos Kvaeget; Saertryk of Maanedsskrift for Dyrlaeger, XXVI. 1915.

epicardium is, however, more marked in colibacillosis than in paracolibacillosis.

The microscopic examination of the liver, spleen and lymph nodes revealed the presence of the well-known necroses which have recently been the subject of numerous publications, particularly by Joest who has described such lesions under the name of pseudotubercles. Christiansen also discusses these conditions in his last report. Doubtless they are characteristic for the infections of the typhoid-paratyphoid organisms in man and in animal, but that they are the sequels of emboli of spleen cells or cells from the lymph nodes, in the sense of Mallory, is not conclusively proven. In fact, Christiansen has infected a splenectomized calf with paracoli organisms and found the usual necroses and pseudotubercles in the liver just as he had observed them in spontaneously infected animals.

The exceedingly toxic character of the organisms causing the enzootic probably accounts for the absence of secondary bronchopneumonia and serous fibrinous exudates on the pleura and peritoneum, which have been mentioned by Jensen and others as usually present.

c. Discussion of the Bacteriological Findings: The blood, organs and intestinal contents were enriched in lactose bile for about 12 hours, and then spread on a modified litmus-lactose medium (100 c.c. of Liebig's 3% agar, reaction plus 0.4, mixed with 13 c.c. of a 1% lactose-litmus solution, previously sterilized in a water bath). The pure cultures obtained from the heart blood or organs were in every instance transplanted on various media; the reactions and changes noted are shown in Table I. The fermentation of the carbohydrates are tabulated in Table II. The organism was isolated without difficulty from the heart blood, the intestines, liver, spleen, etc. It is a short rod, with rounded ends, stains easily with the ordinary aniline dyes, but is not Gram nor acid fast. In alkaline broth, short coccoid or long filaments with marked motility were constantly seen. The cultural characteristics studied in comparison with many other bacteria show that the organism is a member of the paratyphoid-enteritidis group.

TABLE I. CULTURAL CHARACTERISTICS

Day after inoculation	Litmus lactose agar	Endoagar	Agar	Gelatin	Broth	Indol.	Glucose Broth.	Lactose Broth	Maltose Broth	Milk	Barsikow I	Barsikow II	Ketsch solution	Neutral-red agar
1	Round, blue, transparent, colonies.	Colorless colonies	Grayish fine colonies, easily coalescing	Whitish gray colonies, no liquefaction	Diffuse turbidity from 1st day on		Turbidity acid & gas formation	Turbidity No gas	Turbidity acid & gas formation	No change	Reddening, coagulation & gas	Unchanged	Reddening, coagulation & gas	Unchanged
2		Slightly Pinkish colonies					Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Slight Fluorescence
3		Ditto					Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto
4		Ditto				Negative	Ditto	Ditto	Ditto	Alkaline	Ditto	Ditto	Ditto	Ditto
14		Ditto					Ditto	Ditto	Ditto	Clearing, yellowish and liquid	Ditto	Deeper blue	Ditto	Ditto

TABLE II. FERMENTATION OF CARBOHYDRATES

The tests were carried out as follows: the sugar free media with the respective carbohydrates, inoculated with the strains isolated, were incubated for 5 days and then titrated with 1/20 N. NaOH.

Designation of strain:	Glucose 1%	Levulose 1%	Saccharose 1%	Maltose 1%	Lactose 1%	Raffinose 1%	Mannite 1%
<i>B. enteritidis</i> 1239	4.0 % acid	3.60% acid	0.3 % alkaline	3.6 % acid	0.2% alkaline	0.2% acid	2.90% acid
<i>B. enteritidis</i> 1222	3.9 % acid	3.35% acid	0.3 % alkaline	3.5 % acid	0.1% alkaline	0.3% acid	2.65% acid
<i>B. enteritidis</i> 1220	4.05% acid	3.70% acid	0.0	3.4 % acid	0.1% alkaline	—	2.90% acid
<i>B. enteritidis</i> 1211	4.10% acid	3.50% acid	0.1 % alkaline	3.35% acid	0.2% alkaline	—	2.90% acid
<i>B. enteritidis</i> 1230	3.45% acid	3.50% acid	0.0	3.25% acid	0.2% alkaline	—	2.55% acid
Experimental calf No. 1	4.10% acid	3.15% acid	0.0	3.30% acid	0.2% alkaline	—	2.60% acid
Controls	1.5 % acid	1.25% acid	1.85% acid	1.80% acid	1.5% acid	1.2% acid	1.10% acid

TABLE II (Cont.). FERMENTATION OF CARBOHYDRATES

Designation of Strain:	Dulcitate 1%	Galactose 1%	Rhamnose 1%	Salicin 1%	Dextrin 1%	Arabinose 1%
<i>B. enteritidis</i> 1239	2.60% acid	3.20% acid	2.70% acid	0.0	0.30% acid	4.30%
<i>B. enteritidis</i> 1222	2.70% acid	3.25% acid	2.70% acid	0.55% alkaline	0.20% acid	—
<i>B. enteritidis</i> 1220	2.70% acid	3.00% acid	2.70% acid	0.60% alkaline	0.00	4.0 %
<i>B. enteritidis</i> 1211	2.70% acid	3.15% acid	2.35% acid	0.40% alkaline	0.15% alkaline	3.8 %
<i>B. enteritidis</i> 1230	2.60% acid	3.10% acid	2.40% acid	0.25% alkaline	0.20% acid	4.0 %
Experimental calf No. 1	2.65% acid	3.15% acid	2.35% acid	0.15% alkaline	0.1 % acid	4.10%
Controls	1.10% acid	1.30% acid	0.95% acid	1.40% acid	1.10% acid	1.9 %

The fermentation of the arabinose was very characteristic, inasmuch as only after several transplants an arabinose fermenting "mutant" was obtained. The strains behaved in every respect like the *Bacillus enteritidis* described by Titze and Weichel, Christiansen and others. For further identification, the bacillus was tested with various agglutinating sera and the following results were obtained:

TABLE III

Antisera	Bacillus isolated from calf 1239
<i>B. Typhosus</i> (Cross)	1:200
<i>B. paratyphosus</i> A (polyvalent 1, 2, 3)	0
<i>B. paratyphosus</i> A (G)	0
<i>B. paratyphosus</i> B (4 & 5)	0
<i>B. paratyphosus</i> B (homo)	0
<i>B. suipestifer</i> (G)	0
<i>B. suipestifer</i> (V)	0
<i>B. enteritidis</i> (A.M.N.S.) (1:10,000)	1:10,000
<i>B. enteritidis</i> (G) (1:10,000)	1:10,000
<i>B. typhi murium</i> No. 1.	1:10,000
<i>B. abortivus equarius</i>	0
<i>B. typhi suis</i>	0
<i>B. Voldagsen</i>	0

TABLE IV

Strains of calves No.	1211	1229	1222	1230	1239	1239(P)
Antiserum <i>B. enteritidis</i> (GS 1:40,000)	1:10,000	1:8,000	1:20,000	1:20,000	1:10,000	1:20,000
Antiserum <i>B. enteritidis</i> No. 18 (1:6,000)	1:2,000	1:1,000	1:1,000	1:2,000	1:2,000	1:2,000

TABLE V

Examination to determine the existence of carriers among the remaining calves.

No.	Calf	Lot No.	Clinical symptoms and temperatures on following dates	Agglutination of Serum Feb. 6, 1915	*Feces examination enriched in bio broth
1	1201	IVa	104.6 (11-XII-14), 103.0 (12-XII-14)	0	Staphylococci, B. coli and streptococci
2	1210	IVa	106.2 (9-XII-14), 103.0 (12-XII-14)	0	B. Coli, staphylococci
3	1213	IVa	No symptoms	0	.....
4	1215	III	No symptoms	0	Staphylococci and B. coli
5	1216	III	No symptoms	1:100	B. coli & staphylococci
6	1217	III	No symptoms	0	B. coli
7	1218	III	No symptoms	0	.....
8	1219	III	Visibly sick, blood-tinged diarrhea; 107 (7-XII-14) 106.2 (8-XII-14), 106.8 (9-XII-14), 106 (10-XII-14, and remained high for several days	1:100	B. coli, staphylococci and B. alkigenes
9	1228	I	No symptoms	0	B. coli and B. meta-coli
10	1229	IVb	104.6 (8-XII-14) weak, 104 (9-XII-14)	0	Staphylococci, streptococci and B. coli
11	1231	IVb	No symptoms	0	Staphylococci and B. coli
12	1234	IVb	Sick and scouring, 103.6 (11-XII-14) 104.5 (13-XII-14)	1:100	B. coli and B. alkigenes
13	1235	IVb	Visibly depressed and blood-tinged feces, 103.7 (30-XII-14) 103 (7-1-15) 103 (12-1-15)	1:200	B. coli
14	1241	II	103.6 (11-XII-14), 103.8 (13-XII-14), 103.4 (23-XII-14), 102.3 (25-XII-14)	0	B. coli and B. staphylococci
	Control,		Healthy, non contact	0	.....

*Bacteriological examination of feces made by Miss Grace Griffith.

The isolated bacteria are pathogenic for guinea pigs and rabbits. They produce exceedingly active toxins. Even the smallest doses when repeatedly applied to rabbits will cause loss in weight and a predisposition to secondary infections to which the animals invariably succumb. The organisms isolated from the various calves are typical representatives of the *Bacillus enteritidis* Gärtner group.

Pathogenicity tests on calves: To strengthen the bacteriological findings and the conclusions that the enzootic among the calves was caused by the *Bacillus paracolon*, two feeding experiments were carried out. These experiments, of which records are given below, demonstrated the high pathogenicity of the isolated organisms for calves. Both animals promptly developed clinical symptoms, but only the first calf, which was three weeks old, succumbed to the infection; the second one—38 days old—was temporarily sick, but recovered. Since the serum examination of the second calf revealed an agglutination of 1:1,000 with the *Bacillus enteritidis* Gärtner, 14 days after feeding, it may be safely assumed that this animal was really infected, but survived, in the same manner as the six other calves which were affected in the outbreak and recovered.

III. FEEDING EXPERIMENTS: (1) Calf No. 1, raised at the University Dairy, 17 days old, was fed (J. T.) with pasteurized milk containing 25 c.c. of a broth culture of strain 1239, January 14, 1915.

On January 15, 1915, the animal showed a temperature of 106.0, a very severe diarrhea of repulsive odor and was very depressed.

January 16, 1915: The animal was somewhat more active; maximum temperature 103.0; the diarrhea was still very marked and of bad odor.

January 17, 1915: found dead in the stable.

Autopsy (by K. F. M. and J. T.): Rigor mortis was still present. The muscles were slightly icteric. In the peritoneal cavity there was a small amount of fluid. The intestines were deeply reddened, swollen and content was blood-tinged and slimy. The mucosa was edematous and studded with hemorrhages; the hemorrhagic inflammation was found in the jejunum and ileum. The cecum was slightly reddened and had a slimy content. The spleen was small and dry. The liver was dark-brownish, architecture indistinct and showed a few focal necroses. The kidneys were slightly swollen and turbid. Mesenteric lymph nodes were considerably enlarged, even for the age of the animal; soft and grayish on section; in the cortex there were a few hemorrhages. The lungs were collapsed and grayish-red; the myocardium, grayish, turbid; the blood, well coagulated.

Pathologic-anatomical diagnosis: Hemorrhagic enteritis, lymphadenitis, degeneration of the parenchymatous organs.

Bacteriological examination of experimental calf: The enriched cultures from the various organs gave the following results:

Mesenteric lymph nodes: *B. paracolon*.

Liver: *B. paracolon*.

Spleen: *B. paracolon*.

Heart blood: *Streptococci*.

Bile: *Streptococci*.

Small intestines: *B. paracolon*, *streptococci* and *B. coli*.

Control test of feces from University Dairy calves on 18th, 19th and 21st of January, 1915, enriched in bile, were negative for the *B. enteritidis*.

(2) Calf No. 2: age 38 days, was fed (by J. T.) 25 c.c. of 1239 on January 27, 1915; showed a rise in temperature and diarrhea, but apparently recovered in a short time.

Jan. 28th—105.3, drank all the milk fed.

Jan. 29th—105.0, drank well, blood stained feces.

Jan. 31st—102.6, blood-streaked feces.

Feb. 1st—104.0, diarrhea and very depressed.

Samples of feces examined on 4th and 5th of February, 1915; negative. Blood examined February 13th, 1915, gave an agglutination 1:1000.

The two calves were raised at the University and neither had been sick nor directly exposed to the infection before entering this experiment. They were under our observation from January 11, 1915, and at no time before the feeding of the cultures did these animals show a rise of temperature or other indication of disease. While under our observation the calves were fed pasteurized whole milk and skim-milk with a little grain and hay.

IV. DISCUSSION OF THE OUTBREAK FROM AN EPIDEMIOLOGICAL VIEWPOINT: We attempted to explain in what manner the infection was introduced. It is the general belief that paracolibacillosis is a stable infection, or is introduced either by milk or by means of apparently healthy carriers. That the disease was the result of stable infection could naturally not be investigated inasmuch as the calves used in the feeding experiments came from various dairies. The suspicion was then directed toward the milk, but only indirect evidence is available that this food was responsible for the introduction of the infection, since from the moment the milk was pasteurized only two new cases developed, which, however, may as well have been infected previous to the pasteurization of the milk.

At the same time, thorough disinfection was carried out. That the milk occasionally harbors the *Bacillus enteritidis* Gärtner, has been shown by Zwick², Hubener³, and Klein⁴, etc., particularly when collected from animals which are suffering from various forms of mastitis. The report of the government veterinarians for the State of Oldenburg in Germany⁵ mentions that in 1902 the number of cases of calf scours was very small. Several veterinarians and farmers attribute this result to the obligatory pasteurization of the milk in the creameries. According to Tapken the infectious diarrhea has frequently been spread by the use of unboiled, skimmed or whole milk.

To what extent carriers were responsible for the infection, we could not determine, since we had no opportunity to investigate this point before the calves were placed in the feeding experiments and are, therefore, unable to express a definite opinion on the debatable question, whether or not calves can harbor the paracoli organisms. The reports in literature are contradictory on this point. Titze and Weichel and Ammann have examined over 304 healthy calves, but failed to find paratyphoid or paracoli organisms. Morgan and Eckbert, Horn and Huber and Christiansen, however, state in their reports that they have isolated paratyphoid-like organisms from healthy calves. Christiansen, therefore, draws the conclusions that the paracoli organisms are constant inhabitants of the intestinal tract and acquire pathogenic properties under certain conditions and are then responsible for the enteritis. It is quite apparent that the explanation given by him is following closely the ideas of C. O. Jensen, brought forward by this writer to explain the coli infections in calves. We have no experimental evidence to support or refute this contention, but feel justified from observations in laboratory epidemics in mice in calling attention to this possibility, even though in our limited feces examinations from healthy calves we failed to find the organisms. Titze and Weichel on the other hand have shown that calves, recovering from paracolibacilliosis frequently eliminate the specific organism for at least 14 days. The danger caused by such temporary carriers is quite apparent and does not need further discussion.

In this outbreak we were interested to know if such a condition

(1) Oldenburgischer Veterinärbericht 1912; reference. Berlin tierarzt Wochenschr. XXI, 1915, page 354.

(2) Arb. ad. Kaiser Gesundheitsamt Bd. 33, 1910.

(3) Deutsche Med. Wochenschrift 1908, No. 24.

(4) Centbl. f. Bakt. Abt. II Bd. 38, 1905.

existed among the remaining 14 calves and two months after the first death among the calves was recorded, a serum test and a bacteriological examination of feces of these bovines were made. The results are tabulated in table V. None of the animals showed paratyphoid-like organisms in the feces; four animals (1216, 1219, 1234 and 1235) showed agglutinins for the *B. enteritidis* and the isolated causative agent of this outbreak. Three of these animals, (1219, 1234 and 1235) were clinically diseased and doubtless infected. The bacteriological examination was only carried out once and is of slight significance, since the organisms of the paratyphoid group are frequently eliminated in intervals only and one examination is insufficient to permit the conclusion that these animals were not latent carriers.

The manner by which the infection was introduced in the feeding experiment could not be determined, but we feel that the raw milk was probably responsible for the enzootic.

V. IDENTITY OF THE ISOLATED *B. PARACOLON* WITH THE *B. ENTERITIDIS* (GÄRTNER) AND THE MEAT POISONING ORGANISM. The fact that the isolated organism gave all the identity reactions of the *B. enteritidis* Gärtner and behaved serologically as such opens also the question whether or not this organism is identical with the meat poisoning organisms. Most of the German investigators conclude that the *B. enteritidis* is identical with the *B. paracoli* of calves, because one is unable to separate the organisms of the Gärtner group according to their pathogenicity for laboratory animals. Through epidemiological investigations we have gradually become accustomed to believe that cases of meat poisoning are due to intravital infection of the meat or food stuffs and not post-mortem contamination by carriers, but from observations in recent years upon paratyphoid B. infections in man, on the other hand, we know that meat is only responsible for infection in a small number of cases and one feels in studying the recent literature that the early conceptions are gradually being modified.

Paratyphoid infections of pork are so common in countries where hog cholera exists that paratyphoid epidemics would be more frequent than is actually the case were the paratyphoid organisms from these species pathogenic for man. The same may hold true relative to the *paracoli* organisms of calves; and even if they are biochemically and serologically identical with the *B. enteritidis* Gärtner, they are as a rule little virulent for man and rarely

possess as high a pathogenicity for man as the true meat poisoning organisms.

Among the staff of investigators, assistants, stablemen, etc., all of whom came in very close contact with cultures, post-mortem material, feces, etc., only one individual, who suffered from chronic mucous colitis and was therefore abnormally predisposed, contracted a severe enteritis in which the paracoli bacillus isolated from calf 1239 was found to be the cause. Inasmuch as the patient completely recovered, and was found to be no longer a carrier, the question of how animal pathogenic *B. enteritidis* occasionally become modified to a human pathogenic organism could unfortunately not be solved. We suspect, however, that under practical epidemiological conditions the susceptibility of the individual plays an important role in transforming animal pathogenic paracolon to a human pathogenic one.

We feel that the above discussion concerning the relation of animal diseases to human infection was appropriate and hope it will stimulate further and more accurate investigations than we were able to conduct.

CONCLUSION

B. enteritidis (Gärtner) is responsible in the United States for certain forms of infectious diarrhea in calves. Our knowledge concerning *B. enteritidis* and paracoli infections, especially in bovines in this country, is very limited. Mohler and Buckley¹ report an enzootic among adult cattle from which they isolated as the causative agent, an organism which belongs to the paratyphoid-enteritidis group. During the course of their extensive investigations they infected a five months old calf by intravenous injection, producing visible indications of the disease including scours. The animal died within three days after inoculation. The subcutaneous injection into another calf caused local and thermic reactions. This calf they subsequently fed with a culture without causing any ill effect and they state "It was unfortunate that this feeding experiment should have been made with an animal previously inoculated with this bacillus, as it seems highly probable that a more or less immunizing was occasioned thereby". Reports of human infections due to *B. enteritidis* (Gärtner) are also rare in this country. Hogan² reports food poisoning in California which he attributed

(1) Nineteenth Annual Report of the B. A. I., 1902, p. 297-331.

(2) California State Board of Health-Bulletin, Vol. IV, Dec., 1908, p. 67-69.

to the meat poisoning bacteria, but since serologic tests were not conducted it is not definitely established whether these cases which were thought to be due to the consumption of beef were actually caused by *B. enteritidis* (Gärtner). Torrey and Rohe³ in their studies in canine distemper mention *B. enteritidis* as an important secondary invader.

Our observations do not permit definite conclusions as to the prevention and treatment of infectious diarrhea occurring in calves after the first few days of their lives; they do, however, suggest that when milk of an unknown quality is fed to calves it should be fed in a pasteurized condition.

Symptomatic treatment is, as a rule, not satisfactory and not much can be expected from either serum or serum and bacterin treatment unless the specific organism is employed in the production of these biologic products.

(3) Jrn. of Medical Research XXVII, 1912, p. 315.

A REPORT UPON AN OUTBREAK OF FOWL TYPHOID*

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Although fowl typhoid has been recognized as such in but few instances in the United States, we believe that in many cases of so-called fowl cholera, fowl typhoid was the real cause of loss and was not recognized because this disease has not received the attention accorded to fowl cholera.

Attention was first called to this disease in 1894 by Theobald Smith who found it to be present in Rhode Island. The following year Moore studied the same disease in Virginia and the first graphic account of an organism as a causative factor coupled with a description of the symptoms, morbid anatomy and the specific organism was presented by him at that time. He isolated and described an organism which he named *Bacterium sanguinarium* and which he

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showed to be the specific causative factor. He suggested the name "Infectious Leukemia" for the disease. Further investigation, however, has shown that the disease is not a true leukemia, but rather a leucocytosis brought about by the infecting organism. Curtice studied an outbreak of the disease in Rhode Island in 1902 and gave it the name of "Fowl Typhoid." This latter nomenclature seems to be more applicable and was accepted by Moore in a later publication. In 1913 Pfeiler and Rehse described the organism anew under the name *B. typhi gallinarum alcalifaciens*.

A brief history of the outbreak which led to the investigation of the disease in California is as follows: In the spring of 1912 a poultry raiser in San Francisco lost several fowls rather suddenly from a disease which seemed to occur sporadically, but which did not spread to other members of the flock. The birds of the flock were kept in small lots of 12 to 25 each. Seven or eight mature hens succumbed to the first attack. A post mortem revealed yolk of eggs in various stages of development and all appeared to be ruptured. Considerable yolk substance was also present in the abdominal cavities of the birds. The owner informed the writer that he attributed the cause of death to "broken eggs" and thought nothing further about it. The carcasses were buried in one of the yards where the dirt was loose and no further trouble occurred during the year.

At the time our attention was first called to the disease the owner gave the following history:

"On May 5, 1913, I had 70 hens and pullets one year old and over, 6 breeding males, and 260 chicks of various ages. The birds commenced to die about the 7th or 8th of May, 1913. The first to succumb were laying hens which had been allowed to run outside the yards and had access to the burial place of those which died last year. The birds did not seem to become affected in any regular sequence, but came down in bunches of 6 to 10 at a time and at intervals of several days. The yolk condition noted in those which died last spring was present, also a peculiar pale condition of the kidneys which led me to suspect poisoning. The birds having been given quite a quantity of water cress for green food, I attributed this as the cause of death, because the contents of the intestines had a more or less greenish tinge.

"An interval of two weeks elapsed before any more birds showed symptoms and these were observed more closely. The first

symptom noticed was the drowsy or sleepy appearance of the affected birds. Soon after, the droppings became soft and of a yellowish color, occasionally streaked with green. They were especially green from one male bird. The birds showed a disposition to stay on the roost, unwilling to move about, sleepy most of the time, head down into the ruff or hanging pendent. They would be sick for 5 to 10 days then die. Both males and females were affected.

"Postmortem examination showed kidneys to be from clay to terra cotta colored, sometimes streaked with red showing capillary congestion and the ureters were filled with a semi-solidified urine. Quantities of free yolk were present in the abdominal cavity of the hens and occasionally the mesentery would be dotted with dark spots. Still believing the birds to be dying from some form of poisoning especially affecting the kidneys, I sent the backs containing the kidneys from several birds to the chemical laboratory for analysis, but no evidence of poison was found."

It was at this time that the writer was asked to make an investigation of the disease. On visiting the place July 25, we found about twenty-five birds consisting of Rhode Island Reds, Barred Rocks and White and Brown Leghorns, both male and female. Nine Rhode Island Red hens were sick at the time. The runs and houses were dry and free from any decaying matter. The sanitary conditions were far above the average. The roosts and dropping boards were clean and the dropping boards had been freshly dusted. The nine affected hens were housed by themselves and showed the same symptoms as those already described. They had been affected three or four days at the time we saw them. The most striking symptom observed at that time was extreme sleepiness and a tendency to remain on the roost. Diarrhea was present in about half of the cases. No young birds were seen as they had been sold for slaughter in an attempt to reduce the economic loss as far as possible. Only a few of the younger birds had died. They appeared to be less susceptible to the disease than the mature fowls.

In young chicks, however, the disease seemed to be very rapidly fatal. A large percentage of several hatches died in from a few days to several weeks of age, all showing the same symptoms observed in the older birds and upon postmortem no pronounced lesions were found, save a peculiar paleness of the intestines and kidneys.

Disinfection of the pens was advised, also permanganate of potash in the drinking water. Instructions were left to send the first dead bird to us for examination.

POSTMORTEM NOTES. July 31. Adult Rhode Island Red hen in good condition. Died on the 12th day after symptoms appeared. Comb and skin about head pale and anemic. Visible mucous membranes pale. Peritoneum pale and showed a yellowish exudate. Intestines pale, contents normal, oviduct somewhat congested. Numerous egg yolks present, varying in size from one to two millimeters in diameter. Some of the larger yolks ruptured. Liver slightly enlarged, very friable, dark red in color with darker red markings occurring in streaks. Indistinct areas of necrosis one to two millimeters in diameter, color of clay evidently under liver capsule. Kidneys swollen, of a clay color with a few narrow red streaks on the surface. Spleen slightly enlarged, lungs normal, heart muscle pale with a peculiar irregular mottling of a light gray color. Blood of heart all contained in auricles very thin and watery.

Cultures were planted on slant agar from liver, oviduct and heart blood. In 24 hours the cultures from the liver and heart blood showed a growth of a short rod-shaped organism, 1 to 2 microns in length with rounded ends. It grew singly or in pairs. It took the aniline stains but feebly showing a dark periphery and lighter center. It did not take the polar stain shown by certain species of the *Pasteurella* group. Cultures from oviduct mixed.

Aug. 4. Barred Rock adult hen in good condition. Died on the 15th day. Dead 48 hours when received. Organs practically same as in the first bird except liver and kidneys. Liver still more enlarged, very friable, red streaks more pronounced. Clay colored necrotic areas absent. Kidneys chocolate brown in color and showing pronounced red streaks and congestion. Mucous membranes, and peritoneum pale. Cultures made on slant agar from auricular blood showed pure culture of the same organism found in first dead bird.

The morphology of the organism isolated from the dead birds, its cultural and biochemic properties, together with the symptoms and morbid anatomy led us to suspect the presence of fowl typhoid. We made a visit to the place where the disease had existed for the purpose of studying the blood of the affected birds, but found that the entire flock had been destroyed.

In order to ascertain the period of incubation, study the clinical symptoms of the disease, carry on some inoculation experiments and verify our pathological findings, we secured a number of fowls of various breeds from a local poultry supply house.

Inasmuch as this disease had been described as affecting the normal blood content, the examination of the blood was begun as soon as the experimental birds were inoculated. The results of these examinations were as follows:

TABLE NO. I

Experimental Fowl No. 1.

White Leghorn Cockerel.

Date	Temp.	Red Cells	Leucoocytes	Remarks
Aug. 8	108.1	3840000	20220	Injected 1 c.c. 30 hour bouillon culture in wing vein at 6 P.M.
Aug. 9	107.	3468000	45220	Diarrhea present.
Aug. 10	109.4	3332000	35600	
Aug. 11	108.6	3036000	31000	
Aug. 12	107.2	2888000	61000	
Aug. 13	107.8	2592000	89440	Writer ill, no further blood count made for some time.
Aug. 14	107.			
Aug. 15	107.2			
Aug. 16	106.5			
Aug. 17	106.	2780000	62320	At this date we learned that this bird had been fed viscera from a fowl out of the affected flock a couple of weeks before.
Aug. 18	106.2			
Aug. 19	106.4			
Aug. 20	106.			
Aug. 21	106.4	2924000	51280	
Aug. 22	106.5			

This bird was in apparently perfect health at the time it was killed and a postmortem examination made. (Aug. 29). The only pathological lesion found was a slightly enlarged and dark colored liver. Cultures were made on slant agar from spleen, liver and kidneys. A pure culture of the organism under observation was obtained from the spleen. The tubes inoculated from the liver and kidneys remained sterile.

Plate cultures in series made from the rectum showed, among many others, probably colon, several colonies resembling those of the organism causing fowl typhoid. From one of the colonies, *Bacterium sanguinarium* was recovered and was shown by the cultural characteristics and the morphology.

TABLE NO. II

Experimental Fowl No. 2. Rhode Island Red hen 1 yr. old (fat)

Date	Temp.	Red Cells	Leucocytes	Remarks
Aug. 9	105.9	3068000	27600	Inoculated in wing vein with 10 min. 24 hour bouillon culture at 3 P. M.
Aug. 10	108.4	2872000	92000	Indifferent to food.
Aug. 11	108.2	2800000	178000	
Aug. 12	108.1	2392000	192000	
Aug. 13	107.6			Many blue stained red cells observed
Aug. 14	104.6			At this date writer was taken ill and only temperature of bird was observed.
Aug. 15	105.6			
Aug. 16	108.4			
Aug. 17	110.			
Aug. 18	110.8			
Aug. 19	111.			Found dead at 8 A. M.
Aug. 20				

POSTMORTEM. Comb and skin of head somewhat darkened. Mucous membranes pale and anemic. Liver greatly enlarged and showed numerous necrotic areas. Spleen enlarged to about five times normal size, dark color and of the consistency of the spleens of cattle which have died from anthrax. Intestines pale, petechial hemorrhages on serous and mucous surfaces, kidneys muddy yellow color showing congestion of the capillaries. Lungs normal, heart covered with fat and normal. Blood all in auricles, thin and watery. Examination of smears made from spleen, liver and kidneys showed the presence of the organism. Pure cultures of *Bacterium sanguinarium* were obtained from liver, spleen, kidney and heart blood.

TABLE NO. III

Experiment Fowl No. 3. Spangled Wyandotte Hen.

Date	Temp.	Red Cells	Leucocytes	Remarks
Aug. 20	106.4	3740000	21282	Fed spleen and portion of liver and kidney of Exper. fowl No. 2.
Aug. 22	107.8	3268000	32300	Indifferent to food.
Aug. 24	109.5	2017000	74680	
Aug. 26	108.9	2628000	35620	
Aug. 27	107.2	3332000	32540	Blue stained red cells observed.
Aug. 28	107.5	3028000	19100	
Aug. 29	107.			
Aug. 30	107.6			
Aug. 31	107.4	3356000	22440	Apparently healthy.
Sept. 1	107.1			Apparently healthy.
Sept. 3	107.			Remained well. Recovered.
Sept. 15				

TABLE NO. IV

Experimental Fowl No. 4. White Wyandotte hen (Very fat)

Date	Temp.	Red Cells	Leucocytes	Remarks
Aug. 24	106.8	3274000	20220	Fed culture of Bact. Sanguinarium at 9 A. M.
Aug. 25	107.	2113000	21000	
Aug. 26	107.	2042000	34400	
Aug. 28	108.1			
Aug. 29	109.8	2000000	98700	Comb pale. Slight diarrhea. Visibly sick. Many blue stained red cells seen.
Aug. 30	110.2			
Aug. 31	111.2	1720000	138670	
Sept. 1				Found dead at 9 A. M.

POSTMORTEM. Mucous membranes of head very pale. Intestines pale and abdominal cavity contained quantity of straw colored liquid. Contents of intestines apparently normal. Liver somewhat enlarged, very friable, and showing areas of necrosis. Spleen dark colored, greatly enlarged. Heart muscle pale, blood thin and watery and all contained in auricles. Cultures planted on slant agar showed in 24 hours pure culture of the organism..

TABLE NO. V

Experimental Bird No. 5. White Leghorn Cockerel.

Date	Temp.	Red Cells	Leucocytes	Remarks
Sept. 1	107.8	2874000	17330	Fed culture of Bact. sanguinarium from rectum of Exp. bird No. 1.
Sept. 2	108.	2532000	47280	
Sept. 3	108.4	2068000	72300	
*Sept. 4				

*At this date the writer was called to another part of the state so did not have a chance to make daily observations upon this bird. On Sept. 20, however, we learned that this bird died on Sept. 9, 1913.

During our investigation of this disease we made differential leucocytic counts upon the blood of fowls affected with the disease and that of healthy fowls. The appended tables show a comparison of our results:

TABLE NO. VI

Differential Leucocyte Counts upon the Blood of Diseased Birds.

Bird No.	Red Cells	Leucocytes	Percentage of Varieties				
			I	II	III	IV	V
			Lymphocytes	Large Mono-nucl.	Polynuclears	Eosins	Mast Cells
I	2592000	89440	23.2	4.2	67.2	1.8	3.5
II	2392000	192000	18.3	2.7	77.1	0.4	1.5
III	2017000	74680	31.6	7.8	53.1	5.7	1.8
IV	2047000	138670	21.2	3.6	88.1	2.2	4.8
V	2068000	72300	20.5	15.7	63.5	0.1	0.1

TABLE NO. VII
Differential Leucocyte Counts upon the Blood of Healthy Fowls.

Bird and Breed	Leucocytes	Percentage of Varieties				
		Lympho- cytes	Large Mono- nucl.	Polynu- clears	Eosins	Mast Cells
No. I Wh. Wyan.....	20220	56.7	6.	33.2	1.9	2.6
No. II Wh. Legh....	17330	42.7	10.2	41.6	2.3	3.2
No. III Wh. Wyan...	22440	60.1	8.2	25.5	3.4	2.8
No. IV B. Rock....	28372	42.2	14.2	35.6	3.9	4.1
No. V B. Rock.....	30017	54.6	6.6	29.3	6.8	2.7

The above tables show that the increase in leucocytes is confined almost entirely to the polymorphonuclear variety which of course affects the total percentage of the other varieties.

In view of the fact that our findings differ somewhat from those of Moore and Dawson, we give below what we found to be the morphological, cultural and biochemic properties of *Bacterium sanguinarium*.

MORPHOLOGY. The individual organisms are short rods with rounded or somewhat pointed ends. They usually occur singly but in clumps or masses from tissue, while in culture they may appear in pairs united end to end. In size they vary from .3 to .5 microns broad and 1 to 2 microns long. There seems to be a peripheral arrangement of the protoplasm observed when stained with fuchsin or methylene blue. This is especially noticeable in smears made from diseased tissue. It is Gram negative.

CULTURAL AND BIOCHEMIC PROPERTIES. The organism is aerobic and facultative anaerobic. It grows readily at from 34 to 37.5 degrees centigrade, somewhat less vigorously at room temperature.

Plain Bouillon. Uniform cloudiness in the media appears at the end of 24 hours. Slight friable sediment but on further incubation sediment becomes more pronounced and viscid, showing pellicle. The reaction is slightly acid during the first 24 hours of growth, later it becomes alkaline.

Sugar Free Bouillon. Uniform cloudiness is seen in the tube at the end of 24 hours. Sediment somewhat pronounced and slightly viscid. The reaction is at first alkaline but at 48 hours distinctly acid with more sediment, viscid in character. Indol is not produced in this medium.

Agar. On agar slant cultures at the end of 24 hours the growth is vigorous and spreading. Growth appears to be made up of indistinct and coalesced colonies. The border is entire and the

growth slightly raised. With the hand lens a granular appearance is observed. It also shows some viscosity when touched with the needle.

On 1% agar plate cultures, the colonies appear as smooth, round, glistening discs, 5 to 8 millimeters in diameter. They are of a very light chocolate brown color by reflected light, slightly raised and with entire borders. Under a two-thirds objective there is a dark center, outside of which is a finely granular zone shading off into a transparent outer border.

Gelatin stab. The growth is moderate, appearing granular all along the line of the needle puncture, slightly spreading at the surface. In 48 hours the growth is vigorous along the line of the needle puncture with feathery like projections into the substance of the medium, the surface growth is not more than at 24 hours.

Milk. There is no visible change in this medium until a long period of incubation has taken place. The reaction tends as time goes on to become more and more alkaline, and at the end of 32 days distinct saponification has taken place and the reaction is very strongly alkaline.

Litmus Milk. The growth in this medium is quite similar to that in plain milk although no saponification has taken place even at the end of four weeks.

Potato. A moderate brownish yellow raised growth appears at the end of 24 hours. At 48 hours the growth is darker in color, glistening in appearance, and old cultures show a muddy brown color. The growth on this medium very closely resembles that of the glanders organism.

Egg Medium. Very slight blistery appearing growth at the end of 24 hours. In 48 hours the character is unchanged.

ACTION ON SUGAR. *Dextrose.* There is uniform cloudiness throughout the tube in 24 hours. The reaction is acid but no gas is formed. On further incubation the acidity becomes more pronounced but no gas is formed even at the end of 72 hours.

Lactose. A slight cloudiness appears in the open arm and curvature of the tube in 24 hours although the closed arm remains perfectly clear: no gas is formed. The reaction is slightly alkaline, becoming more alkaline upon further incubation with slight sediment.

Saccharose. A very slight cloudiness appears in the open arm of the tube in 24 hours: the closed arm is clear. No sediment occurs: the reaction is at first neutral becoming alkaline in 72 hours: no gas is formed.

RESISTANCE OF THE ORGANISM. The action of direct sunlight upon the organism destroyed it in 25 minutes. It will live for 32 hours in the dark in the dried condition. It is killed by a temperature of 60 degrees C. in 10 minutes.

A 3% solution of phenol destroyed it in 8 minutes.

INOCULATION EXPERIMENTS ON OTHER ANIMALS. *Guinea Pig.* A female guinea pig of 460 grams weight was inoculated per subcutem with .3 c.c. of a rich bouillon culture of *Bact. sanguinarium* on Aug. 15 and was found dead at 8 A. M. on Aug 20. The organism was recovered from the tissues.

Rabbit. A good sized rabbit inoculated intraperitoneally with 1 c.c. of a 24 hour bouillon culture showed for the first 24 hours a slight rise in temperature, profuse watery diarrhea, and dumpishness, but soon recovered and remained well.

During the past few years quite a little attention has been accorded to a disease of fowls which although primarily being studied as a disease of young chicks is now recognized as affecting adult fowls. This disease is known under the names bacillary white diarrhea in chickens and also as fatal septicemia of chickens. In 1908 Rettger and Harvey published their findings upon the study of this disease and announced the discovery of an organism which they named *Bacterium pullorum*. In 1912 Jones reported finding this organism in a fatal outbreak of disease in adult fowls. Since Jones reported his findings it has become a well established fact that young chicks which have recovered from this disease may harbor the germ and when mature transmit it through their eggs as adult fowls.

Because of the similarity to a certain extent of the morbid anatomy in the disease caused by *Bacterium sanguinarium* and that produced by *Bacterium pullorum* in adult fowls, we give below a comparison of the morphology, cultural, biochemic properties, and the resistance of the two organisms:

	<i>Bacterium sanguinarium</i>	<i>Bacterium Pullorum</i>
<i>Morphology</i>	Rod shaped, 1 to 2 microns in length, ends rounded or pointed. Occurs singly or in pairs.	Rod shaped, average 3.5 microns long, ends round, occurs singly or in pairs.
<i>Staining</i>	Takes a peripheral stain.	Stains uniformly.
<i>Agar Plates</i>	Colonies smooth, round, glistening, 5 to 8 millimeters in diameter, slightly convex, finely granular.	Colonies round, 1 to 2 millimeters in diameter, convex, finely granular.
<i>Agar Slant</i>	Growth vigorous, spreading.	Growth moderate, restricted to needle track.
<i>Gelatin Stab.</i>	Moderate, granular, becoming feathery. Non-liquefying.	Uniform, filiform, non-liquefying.
<i>Potato</i>	Growth moderate, becoming vigorous with age, dark brown color.	Very slight or no growth at all.
<i>Milk</i>	Not coagulated, saponification.	Not coagulated, becoming slightly acid.
<i>Glucose Bouillon</i>	Acid and no gas.	Acid and gas or acid and no gas.
<i>Lactose Bouillon</i>	Remains alkaline. Sediment.	Remains alkaline.
<i>Saccharose Bouillon</i>	Reaction at first neutral becoming alkaline.	Alkaline throughout.
<i>Indol</i>	Indol is not produced.	No indol produced.
<i>Resistance</i>	Killed in 25 minutes by direct sunlight. Killed in 8 minutes by 3% carbolic acid.	Killed in 5 minutes by 1% carbolic acid.

SUMMARY. A careful review of the work done by us during our investigation of this disease would warrant the conclusion that we were dealing with the disease described by Moore in 1895 as Infectious Leukemia, confirmed by Dawson in 1898 and studied as Fowl Typhoid by Curtice in 1902.

We have found that there are certain differences observed by these writers to which we wish to call special attention. Moore states that "diarrhea is not present" while Dawson observed that "there is a profuse diarrhea."

In the same way Dawson describes the organism as "coagulating milk in one day" while Moore announced a "saponification of milk after a period of incubation" and no coagulation.

During our experiments and as described by the owner in the outbreak resulting in the investigation, diarrhea was present in about 80% of the cases. Again, we have found the organism to saponify milk in four to five weeks while no coagulation occurred.

Moore has called attention to the fact that examination of the blood of a diseased fowl, Toisson's fluid being used as a diluting agent, showed that numerous red corpuscles appeared to take the blue stain more or less intensely. Ward in his bulletin on fowl cholera draws attention to certain cells not leucocytes, taking the blue stain and described at some length the morphology of these cells. Undoubtedly Ward was describing what later Warthin designated as "thrombocytes". Burnett has called attention to these cells and describes them as being "undoubtedly the result of degeneration."

During the work just completed on this disease, we wish to corroborate the findings of Moore. In making examinations of the blood of diseased fowls, using Toisson's fluid as a diluent, we have found in every case red cells showing all the characteristics of a normal red blood cell of healthy fowls, except that they were stained more or less intensely blue. As many as nine of these cells have been observed within the 9 sq. mm. ruled space of the Zappert-Ewing counting chamber. The so-called thrombocytes were also noted and comparison as to morphology drawn. We have not found these blue stained red cells in examining the blood of normal fowls.

CONCLUSIONS

A study of the work done by us seems to justify the following conclusions:

1. Fowl typhoid is a specific disease of fowls caused by *Bacterium sanguinarium* occurring sporadically and causing heavy losses among affected flocks; and unless properly investigated may easily be mistaken for fowl cholera because of its high mortality.

2. The specific morbid conditions consist of an enlarged liver containing necrotic areas, an enlarged spleen and a general anemic condition of the serous and mucous membranes together with a marked increase in leucocytes and a corresponding decrease of the red cell content of the blood.

3. The increase in leucocytes seems to be confined to the polymorphonuclear variety.

4. Fat, well conditioned, adult fowls are more susceptible than young, nearly mature growing birds.

5. Birds may contract the disease by the ingestion of pure cultures of *Bacterium sanguinarium*.

6. Birds fed upon the offal of other birds dead of this disease show a mild non-fatal form of the disease tending to recovery.

7. There is evidence that recovery from this mild form produces more or less of an immunity. Further investigation upon this point is needed.

8. The power of some of the red corpuscles of the affected fowls to take the violet stain, when the blood is diluted in Toisson's fluid is especially noticeable in this disease.

9. While the lesions produced in fowls which are infected with *Bacterium sanguinarium* resemble in many respects those produced by *Bacterium pullorum*, and although there is a still closer resemblance in the biological characters of the two organisms, there is enough difference to warrant the conclusion that they are distinctly different diseases.

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ABSTRACT OF DISCUSSION

DR. K. F. MEYER: Through the courtesy of Dr. Haring I was able to autopsy, the following year, some of the fowls from the same flock, and I was able to isolate the same organism and to corroborate his findings. We were vitally interested in this organism from the viewpoint of its relation to the typhoid bacillus and to other organ-

isms, and our work was in progress when a publication appeared in which practically all the conditions which we intended to investigate were already thoroughly discussed, namely, this bacillus of fowl typhoid is closely related to the *Bacillus typhosus*. It is gratifying to find others who support us. We were able to agglutinize this organism very satisfactorily.

In regard to the earlier observers of the organism, although they do not agree in all things, it is nevertheless shown to resemble closely the *Bacillus typhosus*. As Dr. Theobald Smith has pointed out there are typhoid strains. Moore isolated an organism which he thought established leukemia, while Pfeiler and Rehse found a large amount of alkali in the milk. By peptonizing the milk and using sugar, they were able to isolate the typhoid bacillus. Guided by the work of Dr. Theobald Smith and others, my assistant, Dr. Christiansen has conducted some experiments along the line of immunity, and, if I am not mistaken, we have an organism which is highly pathogenic to rabbits. He is therefore proceeding to test rabbits as to their immunity where various typhoid organisms have been used for their immunization. The question arises, is this bacillus responsible in some instances for typhoid-like infections among men? Who knows but that this may be the connecting link in the chain? Dr. Christiansen is making an examination relative to the motility of the bacillus isolated from typhoid cases. Is it not possible that we sometimes look only for the agglutination and sometimes only for the microscopic conglutination, and pass over vital points? Perhaps we have overlooked some of the causes of typhoid which might be traced back to chicken salad and other food products prepared with chicken material, a very important question for human practitioners. Therefore we have taken up the question as to whether or not the typhoid bacillus can exist in the body of a chicken. Dr. Christiansen will give some of his experiments which bear on the question of the relation of the fowl typhoid bacillus with the typhoid bacillus in the human.

DR. CHRISTIANSEN: In the first place, it is not generally supposed that typhoid is able to exist in the body of a chicken. Statements have been made, I believe, as to the length of time required for the body of a chicken, to rid itself of the typhoid. We found that certain strains of typhoid are much more pathogenic in some chickens than in others. Working with the infected strain we found we could recover the typhoid from the blood of a chicken eight hours after inoculation. Furthermore, after nine hours inoculation, the chicken was dead, but whether or not that was due to shock or whether it was due to the toxicity of the typhoid, we are not able to state. Further experiments in this line are now being conducted, namely: we introduced an occlusive sack into the peritoneal cavity of a chicken containing typhoid organism with the hope that possibly the environment would tend to induce or perhaps inhibit the

motility of the typhoid strain, in other words, would, if possible, produce a mutation of the typhoid into the fowl organism.

Another interesting observation is that the agglutination of the typhoid or rather the conglutination of the various strains of fowl typhoid differ from ordinary typhoid serum. For instance, we find that a rabbit immunized with the army and navy strain was protected against a lethal dose of fowl typhoid organism.

Still another experiment we have in mind and are now conducting is to determine whether or not certain substances found in a chicken's blood or body tissue, in connection with the temperature of a fowl's body, will produce mutations in the typhoid organism; that is, by growing typhoid organisms, prepared from chicken meat and containing chicken blood at higher temperatures, or at temperatures of the fowl body, if we cannot inhibit the motility of the typhoid or cause it to lose its motility altogether, and increase the agglutinizing effects of fowl typhoid serum.

These experiments we hope to have recorded in the near future.

DR. EICHHORN. I think it would be of interest to mention the experiments which are now being carried out in the pathology division of the Bureau of Animal Industry in regard to the *Bacillus pullorum* as to its diagnosis in chronic cases. The preparation used is somewhat similar to that for the diagnosis of tuberculosis, but of course it represents only a product of the organism and the intradermal test of a chicken is made and the reaction is somewhat similar to the tubercular reaction in fowls. You are no doubt familiar with the work of Mr. Demas on the effect of intradermal reaction in fowls. The results are not conclusive but are very promising and aim to make possible the determination of the disease in its chronic form when usually the ovaries are affected, and in that way separate the diseased animals from the healthy flock and prevent subsequent infections.

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PASTEURIZATION IS NOT A SUBSTITUTE FOR DAIRY HYGIENE*

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The most noticeable development in milk hygiene in the last two or three years has been the growth of sentiment in favor of pasteurization. At one time there was considerable prejudice against pasteurized milk, partly because the process was first used secretly by milk dealers to preserve unclean milk. In the first attempts to make the process really effective in the destruction of harmful

*Presented at the meeting of the Pennsylvania State Veterinary Medical Association, Pittsburgh, Feb. 23, 1916.

bacteria, the milk was exposed momentarily to temperatures sufficiently high to destroy the bacteria immediately. This method is known as the "flash" or continuous process. The degree of heat necessary to make this method effective gives the milk a cooked taste, prevents the cream from rising, renders the milk less digestible by coagulating the albumin, and precipitates the soluble phosphates, the latter change being held responsible for the occurrence of Barlow's disease and rickets in infants nourished on such milk. It also destroys all of the lactic acid bacteria while permitting the spore-forming peptonizers to survive, so that the milk does not sour like raw milk but undergoes putrefaction. The process therefore met with considerable disfavor on both commercial and hygienic grounds. Later, it was found that lower degrees of heat continued for a longer time exert a destructive action upon the harmful bacteria equal to that produced by higher temperatures acting momentarily. At the same time, if the temperature does not exceed certain limits, the milk is not changed in any way and some of the lactic acid bacteria survive. Milk pasteurized by this method, which is known as the "holder" process, was much more favorably received, the distributors being particular to keep the temperature below the point at which the cream line would be affected or a cooked taste produced.

Perhaps the greatest factor in the growth of sentiment in favor of the pasteurization of milk was the approval of the process by the Commission on Milk Standards of the New York Milk Committee in 1912. Another important influence was the fact that pasteurization offered to local health authorities a practicable means of preventing the spread of typhoid fever, diphtheria and scarlet fever through milk. The infection of milk with typhoid bacilli through the use of infected water to wash the milk vessels or through infection carried by returned bottles can be prevented by suitable measures. It is possible also to prevent the direct infection of milk by persons in which typhoid fever, diphtheria or scarlet fever is well-developed, or by persons attending such patients and by convalescents, but there is no certain method of guarding against infection of milk by ambulatory cases and bacilli carriers. Tubercle bacilli are more frequently present in milk than bacilli of typhoid fever and diphtheria or the virus of scarlet fever, but the effects produced by tubercle bacilli do not become apparent for some time after infection and are usually of a mild, chronic type, while the

occurrence of typhoid or diphtheria bacilli or scarlet fever infection in milk is manifested almost immediately and in a pronounced form; a large number of the persons ingesting the milk are affected with an acute disease of a serious character and usually some die. Consequently, the general public as well as health officials is profoundly impressed with the importance of protecting milk from contamination with the infectious agents of these acute infectious diseases.

The approval of pasteurization of milk by the Commission on Milk Standards was qualified by certain requirements, all of which are equally important. It seems to be quite well-known that the Commission stipulated that the milk should be heated to at least 140°F. for not less than 20 minutes and that it provided that the time of exposure can be reduced one minute for each degree the temperature is increased until the temperature reaches 155°F. and the time of exposure is reduced to 5 minutes. But it does not appear to be so well-known that the Commission also laid down certain requirements regarding the cows from which the milk is to be obtained, the conditions under which it is to be produced and the bacterial content before and after pasteurization. For Grade A milk it is required that the herds shall be examined every six months by a qualified veterinarian; that the sanitary conditions and methods shall score at least 65 on the Bureau of Animal Industry score card, and that the milk shall contain not over 200,000 bacteria per c.c. before pasteurization and not more than 10,000 per c.c. at the time of delivery to the consumer. Milk from dairy farms which do not meet these requirements may be sold as Grade B pasteurized milk provided the cows are submitted to a physical examination once a year, and provided also that the bacteria do not exceed 1,000,000 per c.c. before pasteurization and 50,000 per c.c. at the time of delivery, but it is urged that these farms be brought up to the A grade as soon as possible.

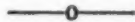
These requirements are too important to be overlooked or ignored. The minimum temperature and holding time approved by the Commission is based upon the results of pasteurization experiments made by American investigators with the tubercle bacillus. The tubercle bacillus was used in these tests because an amount of heat sufficient to kill this organism will also kill the bacilli of typhoid fever and diphtheria and the virus of scarlet fever. Russell and Hastings found that tubercle bacilli added to milk from artificial cultures were killed by a temperature of 140°F. in 10 minutes.

Theobald Smith found that tubercle bacilli suspended in physiological salt solution were killed when heated at 140°F. for 15 minutes, while Rosenau found it necessary to heat milk for 20 minutes at 140°F. to kill tubercle bacilli added to it from artificial cultures. These experiments were all made in the laboratory with small quantities of fluid heated in a water bath. Subsequently, Rosenau experimented with artificially infected milk in a commercial pasteurizing plant and came to the conclusion that in commercial pasteurization a temperature of not less than 145°F. for 30 to 45 minutes was necessary to kill tubercle bacilli. The Commission on Milk Standards therefore recommended that in order to allow a margin of safety, milk pasteurized under commercial conditions should be exposed to a temperature of 145°F. for 30 minutes. The experiments of Hewlett, in England, confirmed those of the American investigators. But a number of other European investigators experimenting with naturally infected milk obtained different results. In some of Woodhead's experiments a temperature of 140°F. killed the tubercle bacilli in 25 minutes but in others 8 hours were required. In Foster and Rullmann's experiments, tubercle bacilli remained alive after exposure to a temperature of 140°F. for 45 minutes, while Yersin, Bitter and Bonhoff found that this temperature could not be depended upon to kill tubercle bacilli in less than one hour. The marked differences in the results obtained by the American and European investigators is due to the fact that the former worked with artificially infected milk and the latter used naturally infected milk. In artificially infected milk the bacilli are naked while in naturally infected milk the organisms are embedded in masses of mucus, clots of fibrin or shreds of tissue and this albuminous covering protects them to a certain extent from the action of the heat. On the other hand, the European investigators experimented with milk from individual tuberculous cows whereas in practice milk from such cows is diluted with the milk of cows which are not tuberculous. In neither series of experiments, therefore, did the milk used correspond to infected milk produced under natural conditions. Nevertheless, the number of experiments in which a temperature of 140°F. for 20 or even 30 minutes failed to kill tubercle bacilli, demonstrates that a physical examination of the cows producing milk to be pasteurized is very necessary. An examination of this kind, if properly carried out, will eliminate the cows infected with tuberculosis which are most concerned in infecting milk with tubercle bacilli.

Bacteria which gain access to milk grow and multiply and in their development decompose the milk constituents into various substances, some of which are harmful to the milk consumer; they also form toxins, both endo- and ectotoxins. The extent of this decomposition and the quantity of toxins formed will depend upon the number of bacteria which get into the milk primarily, and the temperature at which the milk is kept. Pasteurization cannot repair the damage done to the milk by the operation of the decomposition processes nor can it destroy all of the toxins. Hence the limitation placed on the number of bacteria permissible in milk to be pasteurized and the requirement that the sanitary conditions and dairy practices on the farms where the milk is produced shall be up to a certain standard.

In an effort to guard against inefficient pasteurization and to insure the prompt and continued cooling of the milk, the number of bacteria which may be present in the milk at the time of delivery is limited to 10,000 per c.c. for grade A and 50,000 for grade B. There is some chance of pasteurized milk being reinfected during cooling and bottling and for this reason pasteurization in the bottle is to be preferred.

Merely heating milk at 140°F. for 20 to 30 minutes is not a substitute for dairy hygiene but is only an additional safeguard against the spread of typhoid fever, diphtheria and scarlet fever through milk.



A NOTE ON THE EXTREME RESISTANCE OF TWO SPORE BEARING MICROORGANISMS

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The spore form of the *Bacillus anthracis* has long been recognized as one of the most resistant forms of micro-organic growth. The organism has been widely used to determine the efficiency of germicides and other destructive agents. The spores will resist drying at least ten or twelve years. They are killed by dry heat in three hours at 140°C., and by steam or boiling H₂O in five to ten minutes, although some resist for much longer periods. A ten per cent solution of creolin does not kill the spores and they are able to main-

tain their vitality in a sixty per cent solution.* The spores of the *Bacillus anthracis* in a dried state and in the presence of albuminous matter, such as blood, will tolerate a temperature above 100°C., and resist the action of absolute alcohol, of compressed oxygen, complete absence of oxygen, exposure to sunlight, etc.**

In the Animal Husbandry laboratory of the Kentucky Agricultural Experiment Station, a culture of *Bacillus anthracis* was desired on short notice. At the time, there were no cultures of the bacillus on hand. There was, however, a slide on the cover glass of which a stain of the organism had been made from a pure culture nine years previously. This slide on being viewed under the microscope showed both vegetative and spore bearing organisms. The organism had been fixed on the cover glass with heat as per the usual technique and stained with plain fuchsin stain. The stain which originally was deep red was not very deep in color when viewed at this time. This was also an indication of its age. The cover glass had been mounted in Canada balsam.

The exterior of the slide was washed thoroughly with alcohol. The slide was immersed in warm sterile water for several hours to loosen the cover glass. The cover glass was broken while attempting to remove it from the slide, and the broken pieces were placed directly in plain bouillon. After having been incubated for the usual length of time, a luxuriant growth appeared in the bouillon which upon examination proved to be a pure culture of the *Bacillus anthracis*. Thus, after having been subjected to a severe direct flame (in fixing on the cover glass), after having remained in contact with the fuchsin stain and Canada balsam for nine years, without oxygen, the spores being brought under favorable conditions grew readily and luxuriantly.

The *Bacillus subtilis* is very closely related to the *Bacillus anthracis*. The spore form of *Bacillus subtilis* is more resistant to heat than the spore form of *Bacillus anthracis*. The importance of thorough sterilization of linen when used in special cases and the care with which the sterilization is done should be emphasized. A hanging drop slide was partly filled with agar culture of *Bacillus subtilis* which showed spores. This slide was wrapped with six small hand towels and placed in the hot air sterilizer. The steri-

*General Bacteriology, Edwin O. Jordan, p. 226.

**Practical Bacteriology, Microbiology and Serum Therapy, A. Besson, p. 526.

lizer was heated to 175°C., and the thermometer ranged from 175° to 200°C. for two and one-half hours. The heat was so great as to char the exterior of the roll of towels. After allowing the sterilizer to cool, the bundle was removed and the slide taken out. A blister was burned on an assistant's hand in removing the slide. Some of the crisp, hard culture was removed from the slide and transferred to plain bouillon tubes and plain agar slants. After twelve hours incubation, a very heavy growth was obtained in each case, which completely covered the agar slants and clouded the bouillon medium.

The two cases mentioned above are concrete cases of the very great resistance of spore bearing organisms and should emphasize the importance of using care in the handling of pathogenic organisms of this type.

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VACCINATIONS AGAINST HEMORRHAGIC SEPTICEMIA*

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One of the diseases which annually causes considerable loss to stock owners and which according to some reports seems to be increasing, is hemorrhagic septicemia. This disease may occur anywhere especially during summer, either sporadically or enzootically and appears to be more prevalent in especially rainy seasons which are followed by hot weather and which is especially favorable for the growth of rank vegetation.

Cattle on mountain pastures or on pastures in which swampy land gives rise to this rank growth are apparently more often affected than are animals which graze over well cultivated areas. It is not our purpose to incorporate in this paper a history of the disease, giving its symptoms, anatomical changes, diagnosis, etc., but to set forth briefly some experiments which have recently been conducted; with the idea of eventually arriving at some form of treatment which will give veterinarians who have until within the past few years been unable to successfully cope with the disease, something which may prove of value in its control.

*A brief summary of this paper was given at the Pennsylvania State Veterinary Medical Association Meeting, Pittsburgh, Pa., February 23, 1916.

In December, 1912, Mohler and Eichhorn reported on some work done in immunizing the buffalo herd in Yellowstone Park against hemorrhagic septicemia. One year prior to that date these animals were reported as dying, and autopsies with subsequent bacteriological investigations revealed the presence of *B. bipolaris bubalisepticus* and established the identity of the disease.

For their work two vaccines were used, the first being prepared by growing the organism five days at 42.5°C., while the vaccine for the second vaccination was attenuated at the same temperature but for only two days. Different preparations of these vaccines after being tested thoroughly on laboratory animals and on sheep were used subcutaneously in the amount of 1 c.c. to the dose. During their experimental work at the laboratories these men also demonstrated by means of the complement-fixation test that vaccinated animals responded after vaccination with the production of immune bodies and reactions were noted even three months following these vaccinations. At the time they reported these experiments, i.e., one year later, there had been no indications of a recurrence of the disease among the buffalo. In March, 1914, Dr. R. R. Clark of Hampton, Va. reported favorably on results obtained by him in controlling the disease with a similar vaccine prepared by the Bureau.

With this information at hand it was decided to undertake the vaccination of herds in Pennsylvania from which we had reports by different veterinarians as to the extent of the disease. During the experimental work at the Laboratory of the Pennsylvania State Livestock Sanitary Board for the past two or three years it was found that strains of *B. bovissepticus* recently isolated and grown for but one generation on culture media, while highly virulent for laboratory animals failed to produce anything more than a slight local swelling when injected subcutaneously in 1 to 2 c.c. doses into calves two to three months of age. This experiment followed previous work done in the attempt to attenuate our strains for vaccination purposes at five and two days with a temperature of 42.5°C. as outlined by Mohler and Eichhorn.

In these experiments vaccine No. 1, grown at 42.5°C. for five days and inoculated subcutaneously into a rabbit in the amount of 0.2 c.c. caused the death of the animal in three days with characteristic lesions of hemorrhagic septicemia. The same vaccine was continued at this temperature, and rabbits injected daily with the same dose, with the result that they continued to die up to and in-

cluding the seventeenth day, after which injections were discontinued. Three attempts to attenuate strains of *B. bovissepticus* failed as we were not successful in so reducing the virulence of the strains that rabbits did not succumb to the disease when injected subcutaneously with 0.2 c.cm. The rabbits injected with this amount of a vaccine incubated for seventeen days also died on the third day following the injections, with typical lesions of hemorrhagic septicemia.

Having demonstrated that 48-hour cultures of the organism were not virulent for calves when injected in small doses, although killing rabbits in from 18 to 24 hours, it was therefore decided to use a similar culture as a vaccine with the idea that such a vaccine should give a greater and more lasting immunity. The vaccine was prepared as follows:—Approximately 100 c.c. of glycerin bouillon was inoculated with one loopful of a strain of *B. bovissepticus*, the flasks placed in the incubator and grown at 37.5°C. for 48 hours, being shaken every 12–14 hours to insure equal distribution of growth. At the end of this time it was placed in sterile, rubber-stoppered, amber colored glass bottles, ready for shipment with instructions to use 1 c.cm. subcutaneously for cattle and 0.5 c.cm. for sheep. Several veterinarians thoroughly familiar with hemorrhagic septicemia were forwarded the material. The following table shows the number of herds and the number of animals in each herd which were vaccinated:

TABLE

Herd Number	Species	Number of animals in herd	Number dead prior to vaccination	Number sick at time of vaccination	Number vaccinated	Date of vaccination	Number dead following vaccination	Healthy animals to date
1	Cattle	170	30	3	140	9-14-15	5	135
2	Cattle	36	2	0	34	9-20-15	0	34
3	Cattle	31	4	0	27	9-21-15	0	27
	Sheep	74	0	0	74	9-21-15	0	74
4	Cattle	43	3	0	40	10- 2-15	0	40
5	Cattle	35	1	1	34	10- 4-15	0	34
6	Cattle	44	0	0	44	10- 4-15	0	44
7	Cattle	24	0	0	24	10- 5-15	0	24
8	Cattle	19	2	2	17	1- 5-16	0	17
9	Cattle	46	1	0	0	.....	0	45
10	Cattle	20	0	1	0	.....	0	20
11	Cattle	18	0	1	0	.....	.	18
12	Cattle	40	7	0	0	.....	.	33

Dose for cattle 1 c.c., Sheep 0.5 c.c. subcutaneously.

Herd No. 1, of 170 animals was pastured on a mountain pasture of several hundred acres in which was a swampy area recently cut over by lumbermen and which showed plenty of rank vegetation. Thirty animals had died prior to vaccination, three were showing clinical symptoms when vaccinated and five died following the vaccination, including the three which were sick. It is not unlikely that had temperatures been taken the other two animals which died would have showed increased temperatures. This was the only herd in which any deaths followed the vaccination; although in herds No. 5 and No. 12 three sick animals were injected.

In herds No. 2, No. 3, No. 4 and No. 5, the disease was immediately checked without further losses.

Herds No. 6 and No. 7 were on farms adjoining that of No. 5 and were given the vaccine as a prophylactic against the disease.

In herd No. 8 the outbreak was checked and the sick animals recovered following the vaccination.

One animal only was sick and died in herd No. 9.

In herds No. 10 and No. 11 a sick animal in each case was treated with iodine internally and both recovered. No further cases developed nor were they vaccinated.

In the case of herd No. 12 the veterinarian made a diagnosis of anthrax and they were vaccinated for the same, but the deaths continued and the second veterinarian was called and found a typical case of hemorrhagic septicemia. Seven young heifers in the pasture where seven others had died, were sold. No further cases developed nor were they vaccinated. The reports in connection with this herd were incomplete and did not show whether the remaining animals on this farm were exposed to the infection.

In summarizing we find that the total number of animals in the infected herds that were vaccinated was 476; number of animals dead prior to vaccination 42; number of animals vaccinated 434; number sick at time of vaccination 6; number of deaths following vaccination 5; leaving a total of 429 healthy at the present time.

It is to be regretted that the last four herds not vaccinated and used as control herds did not develop the disease to a greater extent. This may be due to a mistaken diagnosis or they may simply have been sporadic cases,—probably the latter. Meyer believes that a clinical diagnosis is extremely difficult and depends upon autopsies and bacteriological findings. In the case of but two herds only did we have specimens submitted for a bacteriological

examination. The others were confirmed by autopsists familiar with the disease.

The herds will be watched during the coming summer for any new cases which may occur and other experiments undertaken in order to further perfect these vaccines and establish if possible the relative values of the immunity conferred.

CONCLUSIONS

The use of 48-hour cultures of *B. bovisepiticus* subcutaneously in the dose of 0.5 c.cm. for sheep and 1 c.cm. for cattle is harmless.

The immunity conferred by this vaccination has not been thoroughly demonstrated, but the sudden checking of losses in several herds may be evidence of some value.

Incubation at 42.5°C. for seventeen days failed to render the strains avirulent for rabbits in the dose of 0.2 c.m.*

*We are indebted to Drs. Super, Dick, Barnes, and Mitterling for the hearty cooperation and records furnished in connection with this work.

THE CHANGED STATUS OF THE HORSE IN WAR*

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When the present great war broke out in all its fury, one could hear and read almost everywhere, that this was to be a contest of machines. The *gasoline engine* particularly was to revolutionize the old-fashioned fighting on land by speedily moving men and supplies to the front in automobiles and motor trucks. The picturesque fight in the air by aeroplanes was at once enthusiastically cheered by the excited peoples of the world, both belligerent and neutral. It seemed as if the old and beautiful martial phantoms of despairing soldiers who perceived in the skies angels with flaming swords astride white horses, and leading hosts of armor-clad warriors against the enemy to crush him, were to be superseded by a panorama of wasp-shaped flying machines spitting fire, conveyed by infantry in armored, tomb-like cars and by artillery drawn by awkward tractors, all spreading destruction. At least

*Printed by permission of the Secretary of War, abstracted from Journal of the U. S. Cavalry Association, January, 1916.

such were the cartoons seen in our magazines and daily papers, and they fired the imagination of the uninitiated populace, drawing with them not a few of our less experienced friends in the army.

Reduced to its absurdity, this was to be a horseless war, almost a manless war.

Little of this fantastic idea has come true. No doubt, this war has developed mechanical combat further than ever before, just as it has reverted to methods of fighting long since obsolete. Military critics have pronounced this struggle not as an evolution of warfare, but as a revolution. Whatever truth there may be in this dictum, we may well investigate and weigh some particular topic as presented by this war, that stands out prominently to men of expert knowledge. There are enough of reports on hand, thrown here and there in our military and other professional journals, to warrant an examination of the subject matter of this article, which we shall consider under the following points:

I. The established value of the gasoline driven vehicles for army transportation and their limitations in war.

II. The horse promptly fills the gap left open by the motor car service in this war, and his value increases accordingly.

III. The combatant capacity of the horse is once more established and leads to a new status of his humane protection and economic preservation.

I. *The established value of the gasoline driven vehicles for army transportation and their limitations in war.*

To summarize the first point of this article, the question of mechanical haulage in war, is about as follows: Just as the steam engine is dependent for speed upon a prepared road-bed and steel rails, so the various gasoline driven vehicles can travel only on improved roads and highways. Automobiles, motor ambulances and motor trucks have become valuable auxiliaries in military transportation, because they are able to save time by shortening distances—if favorable conditions prevail. Under unfavorable conditions of weather and roads no motor car can be depended upon for reliable service. They deteriorate rapidly by the undue wear and tear demanded in war service, and they are very vulnerable to missiles. Their usefulness in war, therefore, is restricted to well defined road-beds, beyond which other facilities for transportation must be provided.

II. *The horse promptly fills the gap left open by the motor car service, and his monetary value increases accordingly:*

Numerous reports from the theatre of war clearly state that in order to provide transportation for the endless network of country roads to supply the smaller military units with food and ammunition, the horse drawn wagons, horse carts or pack horses were found to be essential. Occasionally even men carriers had to be employed to supply the high mountain trenches.

Thus it appears as true as ever that man and horse, the two animated machines that have fought side by side since the dawn of mankind, do still supply the only safe means to draw or carry loads over muddy roads, over ploughed fields, through streams, across ditches, hedges, and up mountains. The motor car, an ingenious machine constructed of inorganic parts and wanting sufficient suppleness, was found helpless here.

As regards the comparative traction power of machines and horses, mechanical experts have never ceased to figure this out by mathematics. We prefer to consider this question in the light of results obtained by comparative tests. Professor Henry, University of Wisconsin, has lately made such experiments with agricultural tractors and horses and he very briefly concluded as follows:

"The energy developed by the horse in proportion to the fuel or feed consumed, ranks him very high in comparison with the best modern engines. The horse is a very flexible motor, able to work at varying speeds and to develop an extremely high power for a short time if occasion requires. The 'motor with the brains' shows a much higher rate of efficiency than the horse power developed would indicate.

Much has also been said by the favorites of the new machines about the great mortality of horses in this war; yet war has always killed men and horses and destroyed all kinds of equipment of the adversary because that is its purpose. The report going through some dailies that two million horses had been killed on the western front can only be judged as a wild speculation. In December, 1914, a French statistician, taking in all the figures made public during the first six months of the war, computed in the *Figaro* that the average life of a man in this war is *six and five-sixth* days, and that of a horse *four and one-third* days; aeroplanes and automobiles lasted *three* days, and motor trucks less than *one* day. While these data were perhaps correct for the first rush of the armies, against

each other in open fields, they are undoubtedly too high and subject to revision after the termination of the war. Still, they may indicate the comparative losses of men, horses and machines as unfavorable for the latter.

There is much rejoicing among interested parties about the exportation of so many horses to Europe. The deal is being looked upon as a good business, particularly as we are told by our government officials, that there are left today in the United States, approximately 21,000,000 horses and 4,000,000 mules; but again numbers do not tell the truth as far as the interest of our army is concerned. Only a comparatively small number of the millions of animals would be found to be serviceable in case of need. About half of this number consists of immature horses and of aged horses, and the rest would show a preponderance of the heavy draught breeds in our fertile agricultural districts. Among the light and active breeds of horses great numbers are unfit and unsound, and these always glut our markets or are retained on the poorer farms and ranches. Our horse breeders believe, that the horses exported were of *medium class only*, and the horse dealers acclaim that prices for *ordinary horses, such as the army consumes*, have correspondingly increased. That is as far as breeders and dealers can see. Worst of all, from the army standpoint, little is made in our stock papers of the fact that we have now on hand over a hundred thousand horses rejected by the foreign buyers. Any officer, who has served on a horse purchasing board, knows that such rejects are utterly valueless. Yet we must retain and absorb them, and the rejected mares will produce that many more worthless horses.

Whatever may be the ultimate result of the exportation of so many horses, more or less suitable for our own army, we should remember that the United States exported only 109,839 horses and 81,524 mules during nearly three years of hostilities of the Boer War, and that ever since we have experienced difficulty in procuring suitable horses for our cavalry. That horses will price much higher is certain, and horse breeders already predict that, if the exportation of horses to Europe continues for a year or more, army horses will be worth \$250 to \$300, as they were toward the end of the Civil War.

III. *The combat capacity of the horse is once more established and leads to a new status of his humane protection and economic preservation:*

The foreign governments importing our horses for the need of war, may or may not have especially considered the \$130,000,000, or more expended for this purchase. Judging from foreign press comments, however, the armies at war realized again the old value of the horse as a combatant factor, otherwise the strenuous efforts to secure sufficient numbers of serviceable horses cannot be explained. A letter by an American with the British army states:

"After making a study of horses and motor cars in this war, I am of the opinion that horses, even though erratic, may be depended upon to a greater extent than motor vehicles and have proved their worth in this war. Having seen horses in action with the Royal Field Artillery of England, it seems that the horses have more brains than some of the men controlling them. They stand still where their mates have been wounded or killed, while under similar circumstances men lost their heads. In rushing over a battlefield a horse will never step upon a wounded or dying man. I heard this before, but did not believe it until I saw it myself."

A German officer expressed himself to an American reporter as follows:

"The horse is absolutely necessary at the front to haul heavy ordnance into position. Our tractors are excellent, but we keep now always horses in reserve. While I have seen horses trembling from the smell of blood or the sight of other horses disemboweled and writhing in agony on the ground, those in harness kept enough will power and courage to perform the heaviest work with the utmost assistance to the men. I am not a horseman, but I have learned to respect the horse for his behavior in this war, and they are treated by us as comrades."

This old truth apparently learned anew in this war, must have been one of the reasons of the sweeping change made by all the belligerent armies, one after the other, for the preservation of horses. The great armies of Europe, well organized as they are in the smallest branches of the service, have always expended considerable effort to protect horses from the ravages of war. Yet, never before has any army adopted such painstaking methods, or applied so thoroughly practical arrangements for the care and prompt treatment of wounded horses than in this war.

It is interesting to note how this new care of the horse in war has indirectly been brought about by the influence of humane societies. Always present and persistent in their laudable endeavors,

they promptly offered their assistance in the care of wounded horses on the battlefield. Of course, horrible tales of suffering of horses had come to their knowledge. An American woman, Clara Barton, admired the world over, contributed perhaps not a little to this new work of mercy in war, for a letter written by her several years ago, was quoted abroad as follows:

"I have often said, that among the shocking and heartrending scenes on the battlefield, the screams of wounded horses lingered more painfully in my ears, if possible, than the moans of wounded men. I think it is necessary that the veterinary surgeon is commissioned to follow the army and put an end to the agonies of the poor, wounded animals which from their great vitality and strength will live long to suffer. They die slow and hard if left to themselves, and I myself have seen the vultures hovering over and tearing at them while life yet remained."

As now constituted, the arrangement for the care of wounded horses on the British—French front, reported by English Veterinary Journals, is as follows: The British army maintains *Mobile Veterinary Sections* for the purpose of relieving field units of wounded and inefficient animals. One mobile section is attached to each division and to each cavalry brigade, and consists of one officer and twenty-two enlisted men of the Army Veterinary Corps, mounted and equipped for emergency treatment. This section is controlled by a senior Veterinary officer serving at Division Headquarters, and is divided into two sub-sections, each with the following duties:

Sub-section I. Collects the wounded horses from the line of battle and applies such first aid as circumstances may permit, or destroys seriously wounded horses.

Sub-section II. Conveys the unfit horses by leading or by horse ambulances to the nearest railroad station, and thence to the *Advance Veterinary Hospital*.

There are ten hospitals in operation, located along the lines of communication. Those nearest to the front are designated as *Advance Veterinary Hospitals*, and they are only fitted for about one hundred cases. Horses received here are sorted according to the severity of wounds. Those needing prolonged or special treatment are transported to one of the *Base Veterinary Hospitals* with a capacity for about one thousand cases. From the Base Hospital such horses as have fully recovered are discharged to the Remount Depot for reassignment to troops, while those needing further re-

cuperation are sent to the Convalescent Horse Depot, location not given, but which is reported to cover an area of twenty miles, provided with pastures and sheltered paddocks.

The personnel of the British Army Veterinary Corps, which is performing such fruitful services at the front, is constituted as follows, according to Royal Warrant, dated October 9, 1903:

One Major General, Director Army Veterinary Corps, two Colonels, ten Lieutenant Colonels, twenty-three Majors, forty-seven Captains, sixty Lieutenants, a total of 143 Veterinary officers. There is also an enlisted force consisting of non-commissioned officers and men, graded as staff-farrier-sergeant, farrier-quarter-master-sergeants, farrier-sergeants, shoeing-smith corporal, shoeing-smith privates. There are also organized Territorial Army Veterinary Corps for Canada, India, Australia and Egypt, which have sent mobile veterinary sections to the various British fronts.

The arrangements for the care of wounded horses of the French Army are not as well known as that of the British. There appears to have been less preparation in the French Army in this respect at the beginning of the war, but this has been rectified as far as veterinary hospital accommodations are concerned, by the assistance of the Blue Cross Society, which is a branch of *Our Dumb Animal League* of London. A large convalescent station for about two thousand disabled horses has been established at Chantilly, from which cured and recuperated horses are returned to the front as needed.

The German Army originally mobilized 1,230,000 horses but owing to the gigantic scale assumed by the Russo-German campaign, this strength was raised to 1,830,000 horses. There have been great cavalry movements over the plains of the Eastern front, and the use of motor trucks on the unimproved roads in Poland is impracticable except for a brief time in summer. The use of aeroplanes is limited on account of the stationary fogs during fall, winter and spring, and cavalry scouting had to be resumed on a large scale. Each German Army Corps has 30,000 horses in war strength; a cavalry division about 7,000 horses. The value of a cavalry horse before the war was 1,500 marks (about \$300).

According to the *Berlin Veterinary Weekly*, each Army Corps is provided with one horse hospital (Pferde-Lazaret) and two Horse Depots. The regulations prescribing the administration and work of these hospitals are as follows:

I. The horse-lazaret is a collecting station for wounded or

unfit horses and a dressing station. It is to hold itself mobile and for this purpose is attached to the first *étappe*. (*Gefechtsaffel*). It is flying the red-star flag for the orientation of those needing its help.

II. The protection of wounded horses is the regulation shelter, or evacuated and disinfected stables or barns, as circumstances may permit. (The movable regulation or shelter consists of prepared piping, screwed together by joints, with canvas roof and curtains to windward. O. S.)

III. Horses quickly cured in the lazaret and serviceable are returned to their organizations. Seriously wounded horses in agony and incurable cases are destroyed. The corpses are burned or buried well off the lines of communication.

IV. Wounded or sick horses requiring more than three weeks of treatment are conveyed to the Horse Depots, which serve as Veterinary Hospitals and Remount grading section combined. The housing of the Depots is to be found in evacuated army stables of occupied cities having railroad facilities if possible. Horses cured and further serviceable are reissued to the troops; those recovered but unfit for further field service are condemned and so branded. They are transported home, mares to be sold to farmers, the rest to traders.

V. Veterinary officers in charge will make running reports to the Corps Staff Veterinarians of the number of horses treated, recovered, reissued, destroyed or transported home for sale.

VI. Utmost diligence is enjoined to preserve the horse supply in reserve at the Depots. The assistance of the Animal Protective Societies (*Thierschutz-Verein*) has been most liberal in furnishing moneys or supplies of woolen horse blankets for winter camps, and many kinds of medicines and dressing that could not be obtained in the occupied territories. In Jena even a hospital for invalid war dogs has been instituted, of which more than 1,500 are employed by the Hospital Corps in searching for wounded soldiers. The tendency of the military authorities is to let all this good work go on to its fullest extent.

The loss of German Army horses during the first six months of the war has been 9 and 91/100 percent. most of it traceable to the great destruction wrought by artillery fire, which has been often specially referred to in reports; yet this loss is less than in former wars, and it is explained by the painstaking professional care of

wounded and unfit horses in the field hospitals, as no saving of life of horses is authorized to officers of mounted contingents while on forward marches on the battlefield.

The number of horses mobilized by the Austro-Hungarian army has been unofficially estimated as one million, and this number also has been considerably increased during the war by recruiting from the listed horses. From the *Central Veterinary Journal* Vienna, it is learned that each army corps is provided with three field hospitals (Feldspital für Pferde.) One of these is an advance section, following the battle lines, the other two are of a more stationary character. Several large convalescent depots are located in the plains of Hungary, where over 10,000 horses were kept for recuperation during the summer of 1915.

The *Animal Protective Societies* of Vienna and Budapest have been very active in collecting and forwarding warm horse covers, flannel bandages and other horse protecting equipments to the front in endeavoring to mitigate the suffering of horses in winter camps.

As regards the care of wounded horses of the other armies at war, nothing definite has come to our notice.

It is a pity, that beside the exalted example of the volunteer work of Humane Societies for the rescue of horses wounded on the battlefield, stands the regrettable fact, that there has been misuse of horses in this war.

One of the brightest and well known captains of the mounted service of our army, recently said to the writer:

"If we take the report as correct that the cavalry on the Western theater of war was practically dismounted within a month, some hard criticism will be heard at the end of this war of the useless attempt to overrun the enemies country with cavalry patrols that lost connection and were bound to be captured; and on the other hand of the adherence to the ancient ethics of dashing charges against unshattered infantry and artillery. If the horses killed by such misuse would have been saved for dismounted cavalry action, the scene on the Western front might look differently."

Extreme hardship to horses is also produced by changed methods of marching. The cavalry is ordered *off the road* and has to ride over ploughed fields to give precedence to the endless caravans of automobiles, motor trucks, ambulances, field artillery batteries, signal corps units, pioneer companies and aeroplane sections.

Continued night marches particularly have resulted in heavy

losses from breakdowns. It is reported by authentic sources that on arrival in camp in the morning, horses were seen to fall asleep so hard that they could not be aroused, a condition of extreme fatigue termed by soldiers *sleeping sickness*. Night marching is also extremely injurious to the hoofs and legs of horses. Artillery horses have been reported as having been for seventy-two hours in harness, the batteries only making enough stops to feed the horses from nose bags. Cavalry horses have been kept under saddle for three days or more to guard against an attack by surprise. It appears that the armies at war are more or less guilty of some form of sinful waste of horses, but for reasons of expediency we omit further details.

We must also omit the discussion of the peculiar injuries and diseases of horses observed in this war, as this subject does not properly come under the scope of this article. It may be briefly mentioned, however, as of general interest, that British Veterinary officers report great trouble with gangrenous wounds caused by the entrance of dirt from certain soils in France, particularly of the Valley of the Aisne. Shrapnel wounds are often fatal on account of tearing of tissue with consequent infection or from the tedious operation of dissecting out large numbers of fragments, as many as forty splinters having been found in a single horse. The greatest trouble to German Army horses on the eastern front are the indigenous lice of Poland, which once contracted are never gotten rid of during a campaign. Numerous outbreaks of glanders have been reported as suppressed from nearly all the fronts, and great vigilance is necessary to prevent the development of an epidemic of this most insidious disease of the horse in war. Anaesthetics are administered in all painful operations in the hospitals, most of the drugs for this purpose being donated by Humane Societies.

In summarizing the second and third points of this article, which explained the reasons for the increased demand of the horse at the front and his changed status in war, the salient features appear to be as follows:

The horse was found to be essential in properly supplying military units which are disconnected with railroad stations and great highways; horse wagons, horse carts and pack horses remain the surest and most economic means of transportation available on country roads, in hilly sections, and during the seasons of fall,

winter and spring. The need of artillery horses, train horses, riding horses and pack mules became so urgent after a few months of hostilities, that British and French government agents purchased in this country half a million horses and mules at a cost to the foreign governments of approximately \$130,000,000 which took away from us a large number of horses more or less fit for our own army.

The combatant capacity of the horse, revealed once more by his willing conduct under fire, leads to a methodical veterinary care of those wounded and unfit, with results appreciated as humane and economic. The saving of lives of horses is accomplished by emergency care performed by mounted veterinary sections following the battle lines; by mobile veterinary field hospitals and by stationary convalescent horse depots. The Animal Protective Societies of the various belligerent countries have received governmental permission to collect funds and supplies for the care of wounded and unfit army horses, and their assistance is now appreciated by army authorities.

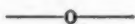
In conclusion it may be stated that the results obtained in this highly methodical care of wounded horses in war, appears to be fully appreciated by the foreign governments concerned, if public utterances of high officials are accepted as testimony. For instance, Lord Lonsdale, after visiting the front on a tour of inspection expressed himself on this subject as follows:

"I think it is only due to all those in the Veterinary Department and the Remount Department to express the extraordinary energy, the love of the animal, the time, hard work, and forethought displayed by all those connected with these two departments. It certainly was a surprise to me, and I went into every detail, and had every facility granted me, and saw every horse, and I do think that we should be not only satisfied, but most grateful to all officers concerned."

This and other similar reports have had the result of lessening the fear and horror of sympathetic people about the reported suffering of horses in war, and they have also led to a due realization of the value of the saving of the great numbers of trained and valuable horses that otherwise would have been lost to the armies.

Impartial reflection, however, must convince our officers to whom such methodical care of disabled horses is novel, that it depends upon a properly functioning Veterinary Service. Such we never had ourselves owing to inadequate support from the army and

Congress. We cannot plead for the extension of such efficient professional care of disabled horses to our army, unless we obtain an expert Veterinary Branch, that is permitted to work seriously and fulfill its beneficent mission. This is by right humane in its tendency and economic in its effect, as has been exemplified by the new status bestowed upon the horse in this latest and greatest of conflicts, which is rocking the civilized world to its very foundation, spreading unspeakable pain, but also producing sublime fortitude and lofty acts towards men and animals.



EXAMINING BOARDS*

THOMAS E. MALONEY, Fall River, Mass.
E. W. BABSON, Gloucester, Mass.

The work allotted to your committee, by vote at the joint meeting of Veterinary College Faculties and Examining Boards of North America, held in New York City during the Fiftieth Annual Meeting of the American Veterinary Medical Association, September 1st to 5th, 1913, was to inquire into the methods and practices of Veterinary Examining Boards in the several states and the scope and character of education given at the veterinary colleges of North America. From the information gathered we were directed to present a report embodying a plan for standardizing veterinary examinations, which shall determine the qualifications of persons to practice veterinary medicine in all of the states of North America.

The committee wishes it to be understood that it purposely refrains from discussing in this report information received from college faculties and examining boards. We believe that the purpose of our appointment will be best served by presenting an arbitrary plan for the conduct of Veterinary Examining Boards, which we submit for your consideration and discussion, as follows:

FIRST. A form of a law, which may be adopted by every state is here with presented. See pages 72 to 75.

The enactment of a uniform law by all states is a very important and necessary step in forming a standard for state veterinary

*Report of the Committee on Examining Boards of the Association of Veterinary Faculties and Examining Boards, Oakland, Cal., September, 1915.

examinations; because every board is limited in its work by the law under which it operates, it therefore follows, that if every board conducts its work under the same law it will be practicable to establish a standard uniform method of determining the qualifications of persons to practice veterinary medicine in all of the states.

SECOND. The character and scope of veterinary examinations shall be the same in every state. The method of conducting, judging and marking examinations, and examination papers, shall be the same in every state.

The subjects in which candidates are to be examined shall be sufficiently comprehensive to cover the entire field of veterinary science, and they shall be limited as detailed in table on page 76. The number of questions which may be asked in a given subject and its sub-divisions shall be limited as detailed in table on page 76.

A prescribed method of judging and marking examinations and examination papers shall be adopted and followed by examining boards in every state. See table on page 76.

The principle to be applied in state veterinary examinations is that a person applying for the privilege of practicing veterinary medicine shall be given reasonable opportunity to demonstrate that he has a competent knowledge of veterinary science and that such demonstration shall be fairly judged.

Veterinary science is divisible into essential and supplementary studies; the essential studies being the important ones should be given greater weight in determining the character of the knowledge presented by the applicant.

The following form (see page 76) is designed to show the scope, division of subjects, relative value of division and method of marking. It is suggested that this schedule be revised by a committee appointed by the Association of Veterinary Examining Boards of North America and reported biennially to the American Veterinary Medical Association for publication.

THIRD. A standard form of reports, application blanks, registration certificates, examination books, and stationery shall be adopted. Forms for same are herewith presented. See pages 77 to 84.

The work of compiling and filing reports and documents for record, reference and exchange will be greatly facilitated if all are of a uniform size and character. It is to be noted that this report and all forms submitted are of a size which we find used by most states for their public documents, and we recommend their adoption, i. e., 5 $\frac{3}{4}$ " x 9 $\frac{1}{8}$ " and 8" x 10 $\frac{1}{2}$ ".

In presenting this outline as a standard for the conduct of state veterinary examining boards the committee does not assume that it is perfect. We believe that in presenting as our report a concrete subject for discussion the desired end, namely, "standardizing veterinary examinations," will be sooner and more satisfactorily attained.

We suggest that each proposition in the outline be discussed separately and after such changes and modifications as may seem necessary have been made it be re-drafted, and copies submitted to every examining board for their consideration, and that they be requested to suggest such changes as they may think proper and return it to the chairman of this committee on Veterinary Education and Admission to Registration, of the Association of Veterinary Examining Boards of North America, who shall re-draft it according to the changes suggested and present it at the next annual joint meeting of the College Faculties and State Examining Boards for further consideration and possible adoption or to take such action as it may.

It is further suggested that each board be requested to submit the form of law presented to its respective state's legal department to consider and suggest such changes as will permit its adoption in that state.

Respectfully submitted,

THOMAS E. MALONEY,
ELMER W. BABSON.

I

LAW RELATING TO THE REGISTRATION OF VETERINARIANS

Chapter ———, Acts of ———.

AN ACT TO PROVIDE FOR ESTABLISHING A BOARD OF REGISTRATION IN VETERINARY MEDICINE

Be it enacted, etc., as follows:

SECTION 1. The governor, with the advice and consent of the council, shall appoint five veterinarians, residents of this
..... and graduates of a school of veterinary medicine recognized by the American Veterinary Medical Association, who shall constitute a board of registration in veterinary medicine. Their terms of office shall begin on the first day of January in the year....., and they shall hold office, one for one year, one for two years, one for three years, one for four years and one for five years, or until

their successors are appointed; and the governor shall appoint annually thereafter, before the first day of December, beginning with the year, one veterinarian, qualified as aforesaid, who shall hold office for five years from the first day of January next ensuing. Any member of said board may be removed from office for cause by the governor, with the advice and consent of the council. The members of the board shall receive a salary of \$..... a year, and their necessary traveling and contingent expenses actually incurred in attending meetings of the board. The secretary shall receive an additional salary of \$..... a year, and his necessary traveling and contingent expenses, not exceeding the sum of \$..... actually incurred in attending to the necessary work of the board. The said salary and expenses shall be paid out of the treasury of the

SECTION 2. The members of said board shall meet on the second Tuesday of January in each year, at such time and place as they shall determine, and shall immediately proceed to organize by electing a chairman and a secretary, who shall hold their respective offices for a term of one year. Said board shall hold regular meetings on the first Tuesday of March, July and November of each year, and such additional meetings at such times and places as they may determine. Said board may make by-laws and rules not inconsistent with law necessary to carry out the provisions of this act.

SECTION 3. Said board shall notify all persons practicing veterinary medicine in this, of the provisions of this act by publishing the same in one or more newspapers in this, and every such person who is a graduate of a recognized school of veterinary medicine, and also every person who has been a practitioner of veterinary medicine in this for a period of three years next prior to the passage of this act, shall, upon the payment of a fee of \$....., be entitled to registration, and said board shall issue to him a certificate thereof signed by its chairman and secretary. Registration under the provisions of this section shall cease on the first day of in the year All applications for registration under this act shall be made upon blanks furnished by the board, and shall be signed and sworn to by the applicant.

SECTION 4. Any person not entitled to registration as aforesaid who is twenty-one years of age shall, upon the payment of a fee of \$....., be entitled to examination, and if found qualified by the board shall be registered and shall receive a certificate of registration as provided in section three. Any person who fails to pass a satisfactory examination and is therefore refused registration may be re-examined at any regular meeting of the board within two years of the time of such refusal, without additional fee, and thereafter may be examined at any regular meeting upon the payment of a fee of \$..... for each examination.

The fees received for examination and registration of applicants before the board shall be paid monthly by the secretary of the board into the treasury of the Said board, after a hearing, may by unanimous vote revoke any certificate issued by it and cancel the registration of any veterinarian who has been convicted of a felony or crime in the practice of his profession.

SECTION 5. Examinations shall be wholly or in part in writing in the English language, and shall be of a scientific and practical character. They shall include the subjects of anatomy, physiology, pathology, diagnosis and practice, surgery, obstetrics, materia medica and therapeutics, bacteriology, laboratory diagnosis, animal parasites and veterinary dentistry, and shall be sufficiently thorough to test the applicant's fitness to practice veterinary medicine.

SECTION 6. The board may establish, with the advice and consent of the governor and council, reciprocal relations with a similar board in any state of North America by unanimous vote and agreement of both boards. Any person applying for registration in veterinary medicine in this, who shall present to this board a certificate of registration, issued by a board with whom this board has established reciprocal relations, accompanied by a fee of \$....., shall, by a majority vote of this board register said applicant without examination, provided however, he shall comply with all other requirements and provisions of the law relating to registration of veterinarians. Chapter, acts of and amendments thereof.

SECTION 7. It shall be the duty of said board to keep a register of all practitioners qualified under this act, which shall be open to public inspection, and to make an annual report to the governor.

SECTION 8. It shall be unlawful after the day of in the year for any person to practice veterinary medicine, or any branch thereof, in this who does not hold a certificate issued by said board.

SECTION 9. The words "veterinary medicine," as used in this act, shall be construed to include the practice, or diagnosis and practice of veterinary medicine, veterinary surgery and veterinary dentistry in regard to any domestic animal.

SECTION 10. Any person not registered as provided by this act who holds himself out as a practitioner of veterinary medicine, or practices, or attempts to practice veterinary medicine in any of its branches in this, shall for each offense be deemed guilty of a misdemeanor, and shall upon conviction thereof be punished by a fine of not less than dollars or by imprisonment for a term not exceeding two months, or by both such fine and imprisonment.

SECTION 11. Said board shall investigate all complaints of the violation of the provisions of section ten of said chapter....., and report the same to the proper prosecuting officers.

SECTION 12. The provisions of this act shall not be construed to prohibit advice or service, in a case of emergency, by a person not entitled to practice veterinary medicine under this act, nor to prohibit farmers from rendering services to their neighbors if they do not hold themselves out as veterinary practitioners under the provisions of this act, and the provisions of sections..... (see below) relating to the practice of medicine within the by physicians and surgeons shall, so far as they may be applicable, apply to the practice of veterinary medicine or any branch thereof by veterinarians.

SECTION 13. Except as otherwise provided herein this act shall take effect upon its passage.

COPY OF CHAPTER 76, REVISED LAWS OF MASSACHUSETTS

SECTION 9. The provisions of the preceding sections shall not be held to discriminate against any particular school or system of medicine or to prohibit medical or surgical service in case of emergency, or to prohibit the domestic administration of family medicine. They shall not apply to a commissioned medical officer of the United States army, navy or emergency hospital service in the performance of his official duty; to a physician or surgeon from another state who is a legal practitioner in the state in which he resides, when in actual consultation with a legal practitioner of this; to a physician or surgeon residing in another state and legally qualified to practice therein, whose general practice extends to the border towns of this if such physician does not open an office or designate a place in such town where he may meet patients or receive calls; to a physician authorized to practice medicine in another state when he is called as a family physician to attend a person temporarily abiding in this; nor a registered pharmacist in prescribing gratuitously, an osteopathist, pharmacist, clairvoyant or person practicing hypnotism, magnetic healing, mind cure, massage, Christian Science, or a cosmopathic method of healing; if they do not violate any of the provisions of section ten.

II

NOTICE

The Association of Veterinary Examining Boards of North America (to be established) has adopted the following schedule of subjects in which candidates for registration in veterinary medicine shall be examined to determine their qualifications:

This board has accepted said schedule and all applicants for registration in veterinary medicine in this state will be examined accordingly.

Weight Per Cent		Time Allowed
30	Anatomy and Physiology	Anatomy Histology Zoology Physiology Hygiene Embryology Three hours
25	Pathology and Laboratory Diagnosis	Pathology Bacteriology Parasitology Meat Inspection Milk Analysis Urine Analysis Three hours
15	Materia Medica and Therapeutics	Drugs Biological products Pharmacology Toxicology Mechanics Physical Forces Three hours
15	Diagnosis and Practice	Sporadic Diseases Contagious Diseases Sanitation Zootechnics Three hours
15	Surgery and Obstetrics	Surgery Obstetrics Dentistry Control and restraint Three hours
Total 100		

Seventy per cent. of total weights are necessary to pass for registration.

Each question shall be marked on a scale of 0-100. The average marks given equals the percentage of weight obtained in each general division.

III
STATE

STATE) BOARD OF REGISTRATION IN VETERINARY
SEAL) MEDICINE

Office of the Secretary.

Member
Member
Member
Member
Member

Chairman
Secretary

.....19...

To.....

.....

My dear sir:

Will you kindly give me such information as you can regarding the claim of of to have been a practitioner of veterinary medicine in this state continuously for a period of three years prior to the passage of the act establishing this Board, to wit:..... day of 19.....

Answers to the following questions and such other information as you may furnish, will be appreciated and treated confidentially.

Yours very truly,

.....Secretary.

PLEASE ANSWER ON THIS SHEET

On the day of19.....

Was he then a resident of your town?.....

Did he then have an office there?.....

Did he then have an office elsewhere?.....

Was he then generally known as a practitioner of veterinary medicine?

Did you know him as such?.....

Has he continued in practice since then?.....

How long to your personal knowledge has he been a practitioner of veterinary medicine in this state?.....

Has he engaged in any other business?.....

The above information is furnished by.....of.....

Date.....

IV

FORM A.

A fee of \$.....must accompany application

Application No.....19....
 Received19....
 Registered19....
 Approved19....
 Rejected19....

APPLICATION FOR REGISTRATION IN VETERINARY MEDICINE

Town or City.....State.....19....

To the Board of Registration in Veterinary Medicine:

I, of
(Write full name, do not use initials)

a graduate of a recognized school of veterinary medicine, having
 power to confer degrees in veterinary medicine, namely.....

....., from which I was graduated in.....
(Insert name of school.)

do hereby make application for a certificate of registration, as pro-
 vided by section....., chapter....., of the Acts of.....

I have practiced veterinary medicine in this state.....years
 at....., years at.....

My residence is.....street,

My office is.....

I am a member of.....

(Give names of veterinary medical societies)

.....
(Signature)

.....ss.19....

Then personally appeared before me the said.....
 and made oath that the above statement, by him subscribed, is true.

.....
Justice of the Peace.

V

FORM B.

A fee of \$.....must accompany application

Application No.....19....

Received19....

Registered19....

Approved19....

Rejected19....

APPLICATION FOR REGISTRATION IN VETERINARY
MEDICINE

Town or City.....State.....19....

To the Board of Registration in Veterinary Medicine:

I, of
(Write full name, do not use initials)

having been a practitioner of veterinary medicine in this state continuously for a period of three years next prior to.....

do hereby make application for a certificate of registration, as provided by section....., of chapter.....of the Acts of.....

On the.....day of....., 19...., I was a resident of.....in this state, and practicing veterinary medicine at....., my office being situated at.....

Since then I have practiced veterinary medicine at.....

(Give places where you have practiced and time spent at each place)

Have you any other business or occupation?.....

State its character.....

I am.....years of age, my legal residence is.....

..... my office is at.....

STATE OF.....

.....
(Signature)

.....ss.19....

Then personally appeared before me the said.....
and made oath that the above statement, by him subscribed, is true.

.....
Justice of the Peace.

VI

FORM C.

A fee of \$.....must accompany application

Application No.....19....
 Received19....
 Registered19....
 Approved19....
 Rejected19....

APPLICATION FOR EXAMINATION FOR REGISTRATION IN VETERINARY MEDICINE

Town or City.....State.....19....

To the Board of Registration in Veterinary Medicine:

I, of
(Write full name, do not use initials)

hereby make application for examination, that I may be registered
 as a qualified veterinarian, as provided by the laws of.....

I was born in....., State of.....,day,
month, 18.....

My preliminary education was received in the.....schools
 of.....

I have received academic or collegiate honors, viz.:.....

I have studied veterinary medicine.....years with Dr.....
 of and.....

I have completed annual courses in the.....Veterinary
 School in.....in the years....., also.....courses
 in the.....Veterinary School in.....in the years.....

I received the degree of.....from.....Veterinary
 School in the year.....

I have had hospital experience, viz.:.....

I have practiced veterinary medicine.....years in.....
 and.....

I am a member of medical or veterinary societies, viz.:.....

My post-office address is.....

STATE OF.....

.....
(Signature)

.....ss.19....

Then personally appeared before me the said.....
 and made oath that the above statement, by him subscribed, is true.

.....
Justice of the Peace.

VII

PUBLIC DOCUMENT. No.

.....ANNUAL REPORT
of the
.....BOARD OF REGISTRATION IN
VETERINARY MEDICINE
FOR THE YEAR.....
STATE
SEAL

VIII

MEMBERS
of the
.....BOARD OF REGISTRATION
IN VETERINARY MEDICINE
Year.....

Member	Chairman.	Residence
Member	Secretary.	Residence
Member		"
Member		"
Member		"

IX

The..... of

REPORT

Board of Registration in Veterinary Medicine.
Secretary's Office.....19....

To His Excellency.....Governor.

Sir:—

(Number of pages necessary)

X
TABLE A

	Number Examined	Number Registered	Number Rejected
July examination			
November examination			
Totals			

XI

TABLE B

Schools represented by candidates	Number Examined	Number Registered	Number Rejected
.....			
.....			
.....			
.....			
Totals			

XII

TABLE C

Number of Examinations held.	Examined	Candidates registered as result of					Rejected
Schools represented by candidates		First Examination	Second Examination	Third Examination	Fourth Examination	Fifth Examination	
Totals							

XIII

FINANCIAL STATEMENT

.....

.....

.....

.....

.....

Respectfully submitted,

Member.....Chairman

Member.....Secretary

Member.....

Member.....

Member.....

XIV
APPENDIX
LAW RELATING TO THE REGISTRATION OF
VETERINARIANS
Chapter..... Acts of.....
AN ACT TO PROVIDE FOR THE ESTABLISHING OF A
BOARD OF REGISTRATION IN VETERINARY
MEDICINE

XV
RULES AND BY-LAWS OF.....
BOARD OF REGISTRATION IN VETERINARY MEDICINE

1. Applications and fees must be in the hands of the Secretary at least three days prior to an examintaton.
2. Candidates are examined by number only, their names not appearing on examination books, and their numbers being known only to the Secretary.
3. Candidates are not informed of their percentages if they fail to pass an examination.
4. No examination questions are given out by the Board.
5. Information of the illegal practice of veterinary medicine given to the Board is held confidentially.

XVI
SCHEDULE OF VETERINARY EXAMINATIONS

XVII
STATE.....
BOARD OF REGISTRATION IN VETERINARY MEDICINE
Application number.....
Examination in.....

Number of											Per
Questions.....	1	2	3	4	5	6	7	8	9	10	Cent
Markings.....	11	12	13	14	15	16	17	18	19	20	

Date.....
.....Examiner

STATE
SEAL

XVIII
INSTRUCTIONS TO CANDIDATES FOR EXAMINATION IN
VETERINARY MEDICINE

Dates.....
Examinations will begin each day at 10 a.m. and continue until 5 p.m. with one hour intermission for lunch.

1. Write your application number (given on your admission ticket) on the outside of the cover of each book before opening it.
2. Write legibly with ink, answer the questions in the order given, and number each answer.
3. The question list must not be detached.
4. Write on both sides of the leaf.
5. The exact time allowed for each book is stated on the question slip.
6. You are at liberty to leave the room when you finish your book, not to return until the hour for the next.
7. Be in your seat promptly at the beginning of the examination hour.
8. Each person is expected to attend strictly to his own work. Communications with others, or attempts to obtain information from the books of others, will be noted.
9. The card designating your number should remain in its proper place during the entire examination.
10. The result of your examination, whether satisfactory or unsatisfactory, will be mailed to your address in about three weeks from this date.

XIX

QUESTIONS IN.....

Time allowed, 3 hours.

1	.....	?
2	.....	?
3	.....	?
4	.....	?
5	.....	?
6	.....	?
7	.....	?
8	.....	?
9	.....	?
10	.....	?
11	.....	?
12	.....	?
13	.....	?
14	.....	?
15	.....	?
16	.....	?
17	.....	?
18	.....	?
19	.....	?
20	.....	?

(Number of pages necessary)

[Criticisms, suggestions and inquiries are invited. Communications may be addressed to Dr. Thomas E. Maloney, Fall River, Mass., or Dr. E. W. Babson, Gloucester, Mass.]

CLINICAL AND CASE REPORTS

PERFORATED BOWEL IN THE HORSE

A. P. DREW, Grand Junction, Colo.

On November 5th, I received a call from Mr. Whittekein, at the Durham stock yards, to come as soon as possible and see a horse that had been gored by a steer. Upon inquiring as to the nature of the injury, Mr. Whittekein informed me that while trying to catch a steer that had escaped from the stock yards, the steer had gored his horse, just in front of the stifle and the bowels were hanging out about six inches. I directed him to get a clean laundered towel, wrap it around the bowel and hold it from coming out any further until I arrived. Also to boil two gallons of water. Upon arrival, I found an aged bay mare, weighing about 1000 pounds, perspiring freely, pulse and respiration accelerated, pawing and wanting to lay down. I administered one-quarter grain each of strychnine and atropine, placed my instruments in a pan to boil, then wrapped a sheet around the animal's abdomen, securely fastening it by sewing with strong twine, leaving the towel wrapped around the protruding bowel. The casting harness was then adjusted, and the animal cast on a canvas blanket. Chloroform was then administered until anesthesia was complete. After thoroughly cleansing my hands I had the sheet and towel removed, the abdominal wound was about 8 inches forward of the stifle joint, and some 8 or 10 inches of the small intestine protruding. The bowel was somewhat congested, completely filling the circular wound in the skin made by the steer's horn. On examining the bowel I found a tear about 2 inches long from which fecal matter was discharging. I then irrigated the bowel and skin in the vicinity of the wound for several minutes with warm, normal salt solution, and placed pads of aseptic gauze, wrung out in salt solution, around the skin wound and bowel. An assistant then held the bowel, grasped firmly between the gauze pads, exposing only the torn surface, while I stitched the wound with an aseptic gut suture, being careful to bring the serous surface in contact, turning the edge of the wound in about one-eighth of an inch. The bowel was again irrigated with warm salt solution, and the skin opening enlarged until the bowel could be returned to the abdominal cavity without using force.

The muscles and peritoneum were found torn for several inches and the skin incision was extended until the peritoneum could be grasped with forceps, and was then stitched with a chromic gut suture. The muscles were also stitched with a chromic gut suture, and the skin closed with braided silk interrupted sutures, placing a piece of iodoform gauze at the lowest point for drainage. The hair was then clipped off around the skin wound, painted with tincture of iodine, and dusted with powdered camphalum. The animal lay quiet for about an hour after the chloroform was discontinued, then was assisted to her feet and placed in a box stall. Her head was hitched short so she could not lay down, and food and water withheld for 24 hours. Water was given in small quantities. Food was withheld for another 24 hours. After this a light diet consisting of bran mash and a small quantity of alfalfa was allowed, and the wound dusted twice daily with camphalum.

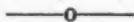
November 6th, pulse and temperature normal.

November 7th, pulse and temperature normal. Animal very hungry, some edema around the wound.

November 9th, pulse and temperature normal, slight discharge of pus from the drain. Administered one ampoule of poly bacterins. Painted wound with tincture of iodine.

November 15th, stitches were removed. Wound healed except small place where drain had been. At this time the animal was turned loose and allowed to lie down for the first time since being injured. Also placed on full ration.

I credit the successful termination of this case, first to the administration of an anesthetic, second, to the free use of normal salt solution, third, not disturbing the hair or skin except to irrigate it with salt solution, until the bowel had been returned and the wound sutured.



THE TREATMENT OF TETANUS WITH TETANUS ANTITOXIN

H. BERGH, D.V.S., Suisun, California.

On a number of occasions when in attendance on various veterinary meetings as well as in a number of personal conversations with other practitioners it has been my experience to hear reports of little or no results from the use of tetanus antitoxin in the treat-

ment of tetanus in horses. My experience has been so different from the usual reports of such treatment and I have so much faith in proper sized doses of tetanus antitoxin that I want to present this report in defense of tetanus antitoxin in treatment.

The first thing I want to say is that if we expect results from the use of tetanus antitoxin in treatment we must expect to give sufficient dosage. It is not uncommon to hear some practitioner say that he gave the antitoxin in a dose of 500 or 1500 units and got no results, which is exactly what one would expect who understands the necessities in connection with this treatment of tetanus. In some sections of the country where the disease is more prevalent and apparently more virulent it is quite possible that even large doses of the antitoxin will not be of a great deal of service. About this I cannot say because I have had no extended experience in different localities. I do want to make it plain, though, that if you wish to get results you must give a sufficient amount. As a preventive measure I have absolute confidence in the antitoxin and believe that 1500 units should be administered whenever one has cause to suspect infection. If we could always do this the disease could be almost entirely prevented, but unfortunately this cannot be done since very often we do not see the case until the symptoms have developed.

The factor of expense, in the treatment of animals with a sufficient quantity of the antitoxin to be effective, in the majority of cases, is a thing which is of prime importance and this cost should be explained to the owner of the animal, at the start, to see if he is prepared to spend the amount of money, which may be necessary in giving the animal enough antitoxin to cure the disease if a cure is possible. My experience has been that we should not become discouraged if the patient does not show an immediate response. I have found in some of my cases treatment was kept up for as long as six or eight days before good results were apparent.

I naturally do not depend entirely upon the antitoxin, as I believe in doing everything possible to aid the animal in its resistance. When it is possible to find the seat of infection, I use strong disinfectants as well as, in many cases, cauterization and the removal of tissues, if advisable. Idiopathic cases I treat the same as others. Of course, I use drugs when indicated, but these are used either subcutaneously, intravenously, or intratracheally, never orally. I find also that much better results are obtained when animals are

confined in a dark box stall away from noise and excitement. I fill the ears of the animal with cotton and use every other method possible to prevent the spasms. I inject the serum subcutaneously into the neck, first clipping the hair and further disinfecting the skin. I presume intravenous injections will act more rapidly than subcutaneous ones and in some cases injection into the vein should be employed. My usual dosage is 9000 units daily, divided into three doses of 3000 units each. I give this quantity when necessary for four days, then decrease to half this amount, giving 1500 units three times a day.

I have been practicing in this one place for the past six years and have had 17 cases. Of these, 12 have made good recoveries treated with the antitoxin as above described. One case died after giving 15000 units. Another died after giving 24000 units. Three cases received no serum and all three of these died.

I give herewith brief case histories: CASE No. 1. Oct. 9, 1909. Was called to see a horse which was lame, due to a recent nailprick. Upon my arrival I found a case of tetanus, and so informed the superintendent, who told me to do the best I could and not hesitate about the expense.

I began with 3000 units in the morning, gave the same dose at noon and the same in the evening. This I kept up for four days. The nail-hole was curetted thoroughly and the following dressing was applied: carbolic acid, glycerin and distilled water, then iodoform gauze, pack and bandage. This I dressed daily. After using 9000 unit doses of serum 4 days, I cut it down to 4500 unit doses for 4 days, then to 1500 unit doses twice daily for 4 days and last about 500 units for a couple of days, twice daily. This mare, weighing about 1800 lbs. made complete recovery and was ready to work within one month. Gave altogether 70,000 units of tetanus antitoxin.

CASE No. 2. Oct. 10, 1909.—Three year old male colt, weight about 900 lbs. When I arrived I saw the colt in the field and was told he had been down about 30 hours. I tried to help him up, but he was as stiff as a board. The horse died that evening, without having received any antitoxin. This case was idiopathic tetanus.

CASE No. 3. May 7, 1910.—Old driving horse, snagged between the 5th and 6th rib by limb of a fruit tree. This horse had been suffering several days from tetanus, according to the history. I advised the owner that the animal was too far gone for treatment,

and as she was only valued at about \$40.00, none was given. She died that evening at 6 o'clock.

CASE No. 4. July 12, 1910.—Four year old heavy draft horse weighing about 1500 lbs. This horse was in the last stages of tetanus and no antitoxin was used. He died a couple of hours later. Had been down two days. Infection probably occurred through an open collar bruise.

CASE No. 5. Nov. 14, 1910.—A horse was brought to me. The owner said that the horse could not eat. I at once diagnosed the case as tetanus. We brought the horse into a box stall, with plenty of bedding. Arecoline hydrobromide 1 gr.; strychnine sulphate $\frac{1}{2}$ gr.; and atropine $\frac{1}{2}$ gr. was at once administered. Trismus was present so I had not much faith in the case, although the owner wanted me to do all I could for him. I gave the animal the same doses of antitoxin as in case No. 1, with arecoline and strychnine twice daily for 3 days. Trismus gradually disappeared, the horse began to eat and drink and was sent home after making a perfect recovery. This was an idiopathic case. Gave altogether 60,000 units of antitoxin.

CASE No. 6. Jan. 11, 1912.—A two year old colt contracted tetanus from a nail in the foot 10 days previous. 45000 units of antitoxin were used and the colt made a good recovery.

CASE No. 7. May 9, 1912.—Was called to Joyce Island to fix a gray stallion's teeth, (as the Supt. expressed it) and when I got there, told them to back the stallion out from his stall. Noticing his stiff gait as well as the membrana nictitans and other symptoms, I diagnosed tetanus. They told me that the animal had picked up a nail in the foot about 3 weeks previous. We had to cast the horse to curette his foot and dress it. The stallion made a perfect recovery. Gave 60000 units of antitoxin.

CASE No. 8. Aug. 13, 1912.—Called to place where they had lost two horses, one and two months previously. They told me over the phone that they knew they had some infectious disease among their horses, but did not know what it could be. Upon my arrival I found a grey horse 8 years old, weighing about 1200 lbs. suffering from tetanus. I questioned them regarding the other two horses that had died and discovered that the first horse had a collar bruise on its shoulder, but they did not think anything of it. The second horse had later on been using the first horse's harness and contracted a bruise at about the same place. This horse also

died, having shown the same symptoms as the first one. The horse was examined and I found a bruise about the same place on the shoulder, as had the other two horses which died. I asked to see the harness and then found that the collar was slightly torn and a nasty scab surrounded the tear. My diagnosis in all three cases was probable tetanus. These three horses had been using the same harness. Of course, the collar was burned in my presence and the other collars were scraped and washed in disinfectants. I treated the animal and to the owner's surprise, he made a perfect recovery. Will add that sometimes preventive measures against tetanus are of great importance as I found out in this particular case. If I had let the tetanus bacilli remain in the old harness, perhaps he would have lost every horse on the ranch. The wound, of course, was treated and the amount of antitoxin used was 55000 units.

CASE No. 9. Jan. 28, 1913.—Was called to see an 1000 lb. horse on pasture. The owner told me he had lockjaw. After seeing the horse, I advised the owner to get a truck and they brought him to his barn. The third day in the morning they rang me up and told me I had better come out and kill him because he was down. I went to see the animal and found that the floor was very slippery. We put in some gravel and straw, got my slings and raised him up, letting him hang in the slings four days, after which they were removed as the horse was doing nicely. Made perfect recovery. Gave 51000 units of antitoxin.

CASE No. 10. July 29, 1913.—Owner came to my office telling me about a fine mule that was not working the way he ought to the last three days; said he had not worked him the last day. I asked him for the symptoms and history. Diagnosed the case as probable tetanus and told him we had better go out at once, which we did and found what I suspected—a well developed case of tetanus. I gave 61000 units of antitoxin. Mule made perfect recovery.

CASE No. 11. Aug. 8, 1913.—Was called to see a yearling colt. Found the colt affected with tetanus and his foot in a frightful condition. The foot was attended to and the leg kept in a strong solution of disinfectant for several days. The antitoxin was used, 40000 units in all. The colt made a speedy and perfect recovery.

CASE No. 12. June 22, 1914.—Owner asked me if I could do anything for a horse with lockjaw. I told him I thought so. Said the horse had been affected for 10 days. I found the horse on pasture in rather bad shape, although he could walk fairly well. I

told them that there was a chance of saving him. They did not believe it and decided if I would take the horse away from the ranch I could have him for nothing. I had the animal brought to my hospital and treated him. After giving 55000 units of antitoxin the animal, a five year old horse weighing about 1250 lbs., made perfect recovery.

CASE No. 13. March 9, 1915.—Found 1500 lb. horse suffering from tetanus. I had him brought to my hospital, examined his feet and found pus in left front foot, caused from a nailprick. I cut out the nail hole, dressed it daily in the same manner as in case No. 1 and gave 60000 units of antitoxin. He made a perfect recovery. The owner of this horse is the same party that owned case No. 5, previously described.

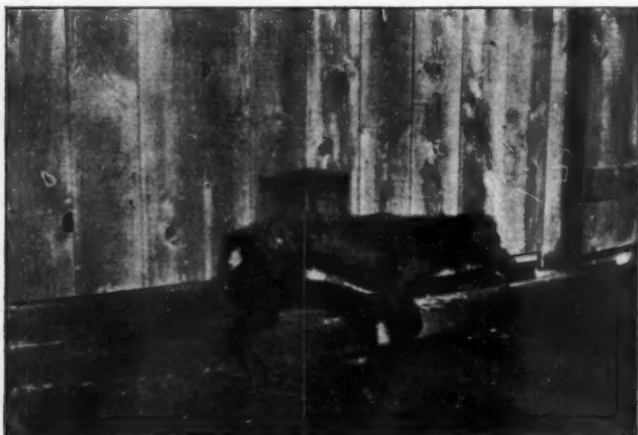
CASE No. 14. July 26, 1915.—Mule with tetanus. I treated the case, which made a perfect recovery, after 60000 units of antitoxin had been given. This was an idiopathic case.

CASE No. 15. Oct. 25, 1915 at 1:30 A. M. I was called to see a three year old colt, weighing about 1200 lbs. Owner told me over the phone that the colt was suffering from colic, as it was down. Upon my arrival I found a case of tetanus and, as the owner had been away for a number of days and had not known about the condition of the colt and could not obtain correct history from the attendant, I was undecided what to do. The poor animal had dug himself deeply into the ground in the corral. I told the owner that I was almost sure I had a hopeless case to deal with and I advised him what the cost of the serum would be, but if the animal should die, he would die within a day or two. He was very fond of the colt and wanted to try the antitoxin. I told him about what success I had with tetanus and I would not lose my reputation by treating this case and I did not want the antitoxin to be knocked if the animal died. I gave 15000 units and he died. This colt got infected through a bruise of the heel.

CASE No. 16. Nov. 25, 1915.—I was called to see a large, three year old colt, weighing about 1400 lbs. suffering from tetanus. I treated the case with success. He made a perfect recovery after 70000 units of antitoxin had been given. The peculiarity about this case was that on the 5th day the owner rang me up and told me the animal was breathing very heavily and rapidly, was practically unable to stand on his feet. I went out and found the animal was foundered. I told the owner not to worry. Here is a

case where leukocytic extract (Archibald) was used and six c.c. of the same was given intratracheally once daily, until 42 c.c. had been given. This is the first of my cases of tetanus where laminitis was also present.

CASE No. 17. Jan. 17, 1916.—A case of tetanus was brought to me. I advised them the same as everybody else about the price, and my success, in those cases, etc. The case was brought to my hospital. A deep wound was found, caused from collar gall. I burned same out thoroughly with a red hot iron, then injected a strong solution of disinfectant. The third evening the animal did not look quite as well as she should. The next morning I saw her early. She was the same as the night before. I watched her, off and on, the whole forenoon. She grew worse and I brought her out to the corral where she fell and I then had her shot. I gave her 24000 units of antitoxin.

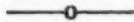


DOG CASE. Jan. 12, 1916 a dog was brought to me with tetanus caused from a foxtail which had entered between the toes. The only thing I did to him was to operate on the foot, disinfected and dressed it twice. Stimulants were given hypodermically but with no results. The third day I destroyed the dog and just prior to the injection of hydrocyanic acid into the heart, I took a picture of him, which accompanies the story. Notice the tail, the gluteal muscles and the legs. The eyes were almost covered by the membrana nictitans.

In conclusion I would say that in spite of all of the reports of unsatisfactory results from the use of this serum, I have the greatest

of confidence in it and with very good reason I believe, when the results I have obtained are considered. All of the antitoxin used was made by The Cutter Laboratory at Berkeley, Cal., and upon inquiry I find that it is the usual practice to place a liberal excess of units in each package at the time it is put up to take care of any loss of potency during its market life and, as I obtain the serum in small lots so that it may be as fresh as possible, the actual number of units given in each case is well in excess of the units indicated upon the label on the package. The units I have given in this report. I always keep 9000 units on hand in my office.

I believe a great many that have reported very poor results will save a good many of their cases if they will use as much of the antitoxin, or even more of it than I have here suggested.



HOW MANY LIVES HAS A CAT?

JAMES H. HESTER, V.S., Santa Barbara, Calif.

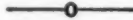
A few months ago a lady brought her pet cat to me for examination, claiming that he was suffering from either a dislocated shoulder or a fracture. A careful examination failed to reveal anything abnormal either with the limb or the cat. As we were discussing the case, the cat which the owner was holding in her arms, made an effort to escape, winced and cried out with pain. Resuming my examination I discovered something about one-half inch long between the lower end of the scapula and the thorax which felt as if it might be the first rib broken with end of lower part turned forward. I was told to take the cat, cut down and find out what the trouble was. The cat's struggles, while the anesthetic was being given, forced the object through to the skin, where a small incision revealed the point of what appeared to be a needle or a pin. Taking hold of this with a pair of forceps I drew out about four inches of a pin which then came to a stop, and although I gave quite a firm pull it would come no farther. Taking up a bistoury I passed it down along the pin, enlarging the passageway, until I drew forth a six-inch hat pin with a glass head about the size of the end of an ordinary lead pencil. I supposed, of course, that it was all off with the cat, but to my surprise he was all right in a few days and has shown no ill effects since. There was no scratch

or wound anywhere on the body where the pin might have entered.

Now the questions before the class are: Where and how did the cat get this pin and where was he keeping it until I found it?

The history of the case: Three nights before, the owner went to the show and left the cat alone in the house. Her hat with two pins in it was on the shelf about six feet from the floor. While the owner was away the folks in the adjoining part of the house heard a noise as if the cat had fallen or jumped from the shelf to the floor. When the owner returned, she noticed the cat retching as if trying to vomit, and put him out of the house for the night, thinking no more about it until I found the pin.

After summing it all up, my guess is that the cat, for some unexplainable reason must have swallowed the pin head first, probably fell upon it, which when it passed down as far as it could was forced back by the movements of the body. But how can you explain such a migratory trip of the pin without more damage being done to the cat, and why did not the contents of the digestive tract escape through the wound where the head of the pin passed and cause trouble?



ABORTIVE TREATMENT OF WOUND INFECTIONS

CARREL, DAKIN, DAUFRESNE, DEHELLY AND DUMAS

The confidence inspired by the use of tincture of iodine and the packing of wounds has disappeared long ago. Experience has shown that the various kinds of military wounds are all infected, and that the application of iodine does not prevent gaseous gangrene, septicemia, or chronic suppurations. It is also known that such complications cause irreparable lesions and even death in a very large number of cases. In 1000 amputations observed by Tuffier at the "Maison-Blanche" the operation was necessitated in about 800 cases, not by the gravity of the trauma, but by infectious complications. In spite of the utter failure of the principles used in the beginning of the war in the treatment of wounds, no new methods were developed. Confusion reigned in the theory and practice of the surgeon. It became therefore, a matter of great importance that the treatment given to the wounded should yield better returns. This result could only be obtained by establishing a single method which would be uniformly used by all, in spite of its tem-

porary and approximate value. In this way the wounded were protected from the therapeutic fantasies due to lack of central direction.

In order to obtain the maximum results with a minimum of suffering, effort and money, it was necessary to prevent wound complications rather than to combat them. It is infinitely more simple to abort an infection in the beginning than to discover efficacious methods for the treatment of gaseous gangrene, septicemia, suppurations and their sequelae.

The principles upon which the abortive treatment of infection should be founded have long been known. But they had not been elaborated into a simple doctrine capable of practical application. The chemical, bacteriological and clinical researches made at the Temporary Hospital 21 of the Rockefeller Foundation at Compiègne, have shown the conditions under which the chemical sterilization of a wound can be realized.

It is known that all wounds made by fragments of shells, grenades, etc., are infected. Bacteriological examination made about 6 hours after injury, shows that in all wounds there is a varied microbial flora, aerobic and anaerobic. Two important facts have been ascertained. The first is that the microbes are generally few in number. Sometimes the smear must be moved and several fields examined under the microscope before a micro-organism is found. The second is that the microbes are localized around the projectile and débris. They have not yet had time enough to spread over the entire surface of the wound. If the examination is made after 24 hours or later, the appearance of the smear is altogether different. A very large number of microorganisms are found. They are often so numerous that they cannot be counted. Besides, they are to be found throughout the entire extent of the wound.

These observations confirm those made clinically. They show that during the first few hours following trauma it is easy to remove infectious organisms, while this operation becomes more and more difficult as the organisms are allowed to multiply, diffuse over the surface of the wound and infiltrate its walls. The abortive treatment of infection must therefore be given as soon as possible after the injury.

In what manner shall this be accomplished? It is known that the microorganisms are localized about the infectious foreign bodies

and in the abrasions in the walls of the wound. While it is easy to remove fragments of shells and débris, it is impossible to mechanically remove small particles of débris and microorganisms lodged in the abraded surfaces. It is therefore necessary to kill the microorganisms attached to the small foreign bodies and to the wound surfaces by means of a liquid which penetrates and will still be in contact with the tissues for a considerable time.

The antiseptic method has already rendered immense service. It were folly to question this because of certain laboratory experiments made with a technic of doubtful value. In surgery the clinical results are paramount.

Dakin has found a solution of sodium hypochlorite which has a very energetic antiseptic action, is not irritant and costs little. The solution, prepared by the method of Dakin, may be used of such concentration that it will sterilize every part of the wound with which it comes in contact. Since this solution will penetrate every diverticulum of the wound, a complete sterilization will be obtained, provided the solution be constantly renewed.

1. *Precocity of the treatment*—At the “first aid” stations, disinfect the skin with tincture of iodine. If the wound be narrow, inject the hypochlorite solution into the crevices. If the wound be large, dress it with gauze soaked in hypochlorite. Do not use water tight material over the dressing. This hasty disinfection is by no means dispensable. It greatly ameliorates the condition of the wound.

The wounded must be transported as rapidly as possible, to the ambulance or to the hospital where they are to receive complete surgical treatment. Only those suffering from severe hemorrhage or shock are to be treated on the spot. Every possible effort must be made to have the wounded arrive at the hospital not later than six hours after the injury. The future of the wounded depends upon the speed of transportation and treatment of the wound as soon as possible. There are no small wounds; some that are insignificant in appearance may be followed by grave complications. All must be completely treated.

2. *Mechanical cleaning of the wound*.—The foreign bodies, projectiles, débris, etc., are immediately removed. The finger, gloved in rubber, is gently introduced into the wound; often the foreign bodies are extracted in this way. Sometimes the radiograph, etc. are necessary. The wound should be opened sufficiently

to permit its cleaning and exploration. But it is important to cause no injury, and to renounce such brutal manoeuvres known as curetting, etc. of wounds. The débris, projectiles, and splinters of bone are delicately removed with the fingers or with dissecting forceps. Hemostasis must be accomplished as neatly as possible. In jagged wounds and especially in fractures, consideration must be given to the extent of the shattering and the location of the diverticula of the wound.

3. *Chemical sterilization of the wound*—An antiseptic acts only at the place where it is applied and then only when applied long enough. The antiseptics used up to the present were very feebly germicidal or too irritant to the tissues. The sodium hypochlorite solution prepared by Dakin is not irritant and its germicidal power is very great. Javel water must not be used. Its content of hypochlorite is not constant, it may contain free chlorine or free alkali, especially when it undergoes decomposition. Every pharmacist can prepare Dakin's hypochlorite solution. (*Presse Médicale*, Sept. 30, 1915). A one-half percent solution is used. This solution is strongly antiseptic and still it may be applied to the skin or to the tissues for several days or even weeks without causing irritation. It must not be used at the same time with alcohol nor must it ever be heated. The solution is injected with an ordinary syringe or with one made of rubber.

The hypochlorite should penetrate all the crevices of the wound. It should be continually renewed because it is decomposed by contact with protein material. To instill it into the tissues, rubber tubes are used, having a diameter of about 6 millimeters ($\frac{1}{4}$ inch) pierced by a single hole about $\frac{1}{2}$ centimeter ($\frac{1}{5}$ inch) from the end. Tubes of different lengths are used, pierced by a hole and provided with attached sponges. When the wound is narrow or a large wound has narrow diverticula, the sponge tubes are introduced into the narrow spaces. In case of fracture the end of the tube should be placed among the fragments. When liquid is passed down the tube, it is imbibed by the sponge and held in contact with the wound surfaces instead of running out immediately. In superficial wounds and in wounds that are large and jagged, naked tubes are applied to the bottom of the wound or introduced into its diverticula. The wound is then filled with gauze. Before finishing the dressing, the liquid is passed into the tubes and the operator assures himself that it reaches all parts of the wound. The dressing is finished with a

layer of non-absorbent cotton, through which the rubber tubes pass. The liquid is to be instilled through these tubes.

The antiseptic must be continually renewed. Every hour or every two hours a sufficient quantity of the liquid is to be injected into the tubes with the aid of a syringe (*seringe de Gentile*). It is still better to use continuous instillation. The quantity to be injected depends upon the size of the wound; it is necessary that the surfaces of the wound be well moistened.

4. *Limbs must be carefully immobilized* in cases of fracture or wounds of the joints. As soon as possible, plaster dressings enforced by metal bands must be used.

The dressing should be examined every day and changed as often as necessary.

5. *Reunion of the wound.*—The lips of the wound must not be reunited until a bacteriological examination has shown that the wound has become aseptic. The time will vary according to the nature of the wound, the nature of the infection, and especially with the length of time elapsed between injury and treatment. Many wounds never become sterile completely, and consequently, must not be reunited. The reunion of tissues must not be made by sutures. It is sufficient to bring the lips of the wound together with adhesive bands, and to bring the deeper parts of the wound together with an appropriate compressive dressing.

The efficacy of the method has been demonstrated by a variety of methods, bacteriological, clinical, etc. The action of the Dakin hypochlorite solution was first studied on suppurating wounds. Comparative tests made on different parts of the same wound or on two similar wounds on one person, showed that in the wound or part of the wound treated by the Dakin solution, the number of organisms diminished, the secretions dried up, while the condition of the control wound or control part of the wound did not change. In these tests it was found that phagocytosis continued and cicatrization took place in spite of the use of the antiseptic solution.

Only one rigorously comparative test was made, because it is rare that one finds a case with two wounds that are identical. Such a case was found, in which two shell wounds were only a short distance apart, (several centimeters). The wound treated with hypochlorite solution through a sponge tube, remained odorless, and without purulent secretions. The other wound suppurated. The observation was confirmed by many other similar ones, but not so rigorously controlled, because wounds are not easily comparable.

Generally, reunion takes place 8 to 14 days after the injury, in such fashion that the wounds are completely cicatrized. Wounds will not become sterile unless the hypochlorite solution penetrates all the recesses; however, the infection is considerably diminished when this does not take place.

Revue D'Hygiene et de Police Sanitaire, Vol. 37, pp. 1016-1024, 1915. (Work done at the Rockefeller Foundation and Hospital at Compiègne, France).

Note by abstractor:—To those not familiar with the metric system of weights and measures, Bureau of Standards Circular No. 47 on Units and Weights and Measures will be useful. A copy can be obtained gratis by addressing a brief note to "The Director of the Bureau of Standards, Washington, D. C." BERG.



REMOVAL OF A SHELL SPLINTER WITH THE AID OF AN ELECTROMAGNET

VETERINARIAN RUDERT

An officer's charger had been wounded in the gluteal region, by a shell splinter.

When the horse came under observation there was a wound with a purulent opening 12-15 cm. long.

The gluteal region was shaved, disinfected and a local anesthetic injected. An electromagnet, obtained from one of the war hospitals, was passed over this region. A distinct swelling was produced over the splinter. The magnet was removed and an incision 3 cm. long was made over the site of the splinter. On applying the magnet a second time, the splinter was drawn through the uninjured muscles and completely removed. A vertical opening into the old fistulous tract resulted, and with ordinary treatment the wound healed readily in 14 days.

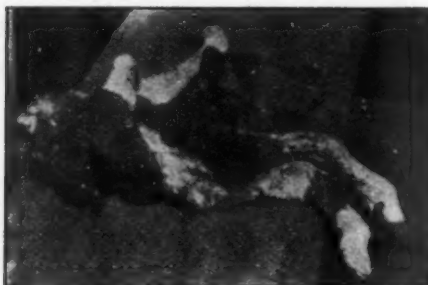
The splinter removed was 5 cm. long, 1 cm. wide and $\frac{1}{2}$ cm. thick.

The conclusion arrived at in this case is that the safest and easiest way of removing shell splinters is by means of an electromagnet. The advisability of constructing a light electromagnet of sufficient strength to extract a splinter through the unbroken skin, is recommended. If it is impossible to make one portable of sufficient strength the hospitals should be supplied with one of sufficient strength and the field hospitals with one strong enough to locate the splinter.

Zeitschrift f. Veterinärkunde, September 11, 1915.

AN ABNORMAL CALF

R. G. FLOWERS, V.S., Fort Worth, Texas.



The above figure is of an abnormal calf delivered from a small Jersey cow belonging to A. M. Moates, Fort Worth, Texas. The calf's head and fore legs were normal. The hind legs were attached to the shoulders and pointed upwards. The internal organs had developed posterior to the legs. The mother is a very heavy milker, has six fully developed teats and gives milk from each of them.



TWO CASES OF PROLAPSUS OF THE RECTUM IN PIGS

STEIGET LAUTERECKEN

The first case was in a sow which had farrowed 8 days before coming under observation.

On examination the prolapsus was found to be of the size of a child's head, the surface was gangrenous. Operation was decided upon for the sake of the young which could not be raised by hand.

The sow was secured on her side, with the hind quarters somewhat raised. The prolapsus was thoroughly washed, first in warm water then with camomile tea. The loose gangrenous tissues were carefully removed with the scissors, and the wound washed again with warm water and camomile tea, the prolapsus was returned to its normal position by pressing gently with the fist, this proved a troublesome process on account of the struggles and cries of the patient.

Dr. Lauterecken then allowed an assistant to hold the rectum in place, and applied a slip-knot (tobacco pouch knot) over the

tissues; this knot was drawn tightly, so that the index finger could just be inserted into the rectum.

The sow was now given a purge of oil, and exercised by driving her for a short distance up-hill.

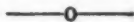
The owner was advised to feed the animal sparingly on milk for a few days, and to give the patient constant exercise by driving her about the place.

In spite of the marked degeneration of the tissues the wound healed readily, and this sow has had another litter of pigs without any recurrence of the prolapsus.

The second case was also in a sow, which had a prolapsus of the size of an apple. The owner said this had been caused by the boar introducing the penis into the rectum.

This case had the same surgical treatment as the first one and recovery was complete. The interesting point about this case is its cause.

Münchener Tierärztliche Wochenschrift, January 1, 1916.



RACHITIS IN CALVES

J. V. HILLS, Gowanda, N. Y.

In late December I was called to examine a three months old Jersey calf, one of a pair of twins I had helped the mother deliver about three months before. The attendant said it had been rather weak for a day or two, and now could not get on its feet, but when helped up would stand for a short time, and was now nearly prostrate.

I inquired as to the feeding, as the calves did not seem much larger than when they were born and suspected faulty nutrition, the calf being apparently in very little pain.

I was informed that they were fed on new milk and a prepared calf meal. The mother was a thrifty cow of about six years, rather larger than the average Jersey.

The attendant had been rubbing liniment on the calf's back and limbs. I told him to continue to do so and left a stimulant telling him the calf would probably die but to let me know the next day, when I was informed by telephone that the calf was somewhat brighter, and they would let me know if it died as I wanted to post the animal.

It was more than two weeks before the owner called me up and said the calf had died the day before, and the other twin which, until now, had appeared well and hearty although not gaining much, acted the same as the first. As treatment was useless we waited until this one died, two days later, and found a typical case of rachitis. The pelvic bones and femurs were hyperemic and so soft that they could be easily crushed with the hands. All of the organs were apparently normal. The other calf which was affected much longer would probably have shown more lesions.

The attendant then told me of a five weeks old bull calf that died before either of the twins was taken sick, and which acted much the same. He told me that both cows were bred to a rather unthrifty young bull that was closely related to them, so this might have been hereditary or more likely due to inbreeding.

There is one more cow to calve and I am awaiting the outcome, as the conditions are similar. Have advised the owner against inbreeding, and will start treating this calf for rachitis when it is a few days old.

The cows are kept in better than average sanitary conditions.



CONTRIBUTION TO THE STUDY OF PARASITIC AFFECTIONS OF THE HORSE. A CLINICAL STUDY OF EQUINE STRONGYLIDOSIS.

This is a very valuable and comprehensive study, in which Leneven has gathered together the scattered data relative to the life histories of the nematodes of the genera *Strongylus* and *Cylicostomum* parasitic in the horse, and the lesions, symptoms, etc., due to them, and grouped these data together to form a clinical entity which he calls strongylidosis. This condition he defines as an afebrile, enzootic disease, beginning usually with symptoms of enteritis and determining a progressive anemia.

Symptomatology, course and termination of the disease. The worm infestation begins while the animals are on the pasture in the spring, and during the succeeding summer and fall there is a latent stage, during which the parasites are undergoing development. The

symptoms, which develop slowly, begin to be evident in November and December, and with the appearance of clinical symptoms the progress of the disease accelerates, the active stage lasting from two weeks to two months. The primary symptoms are diarrhea, anorexia and emaciation. The diarrhea is at first slight, the feces becoming increasingly soft and malodorous. The appetite is at first irregular, then diminishes and finally disappears. The emaciation may at first be concealed by an edematous infiltration filling the lacunae formed by the absorption of fatty tissue; the ultimate emaciation is very marked, the bones prominent, the coat rough, the eyes sunken and the animal very weak. Accompanying the primary symptoms are a small, thready, irregular and at times intermittent pulse, and a pale, anemic, often more or less edematous conjunctiva and buccal and vulvar mucosa.

Secondary symptoms are edema and those due to accidental complications, such as toxi-infection, thrombo-embolism and trauma. Edema may be general (resembling anasarca) or localized; it may appear slowly or abruptly, according to the mechanism producing it. When the heart weakens, there is a slowing of the circulation with a resultant stasis, extravasation and edematous infiltration, giving rise to a progressive, generalized edema; in patients with aneurisms, emboli may not only give rise to colic by their occurrence in the mesenteric vessels, but in the peripheral circulation they may cause slowing or arrest of the circulation with extravasations and edema, the edema being relatively localized, voluminous and rapidly developing.

Of the complications, toxi-infection is indicated by a febrile condition, the infection causing internal or external metastatic abscesses or infectious arthritis or synovitis. Thrombo-embolic complications may occasion the death of the animal or give rise to intermittent colic. Traumatic accidents consist in decubitus from weakness, internal hemorrhage from rupture of aneurisms, or peritonitis from intestinal perforation at the site of a verminous cyst or abscess in the intestinal wall.

The disease terminates in recovery or death, occasionally passing into a chronic condition. Recovery follows elimination of the parasites and healing of the lesions caused by them. Death may be due to one of the accidental complications mentioned or may follow a prolonged anemic, toxic condition with general infection. In chronic cases the lesions are irremediable, the intestinal mucosa

and muscular coat remain thickened and sclerotic, nutrition is impaired, aneurisms impede the circulation, edema, emaciation and diarrhea persist, and the appetite remains capricious.

Etiology and pathology. The foregoing conditions are due to adult and immature worms of the genus *Strongylus* and *Cylicostomum* (the reviewer has taken the liberty of correcting what he regards as errors in the scientific names). The adults of these worms live in the cecum and large intestines. The immature forms have life histories varying with different species. The adult female worms develop eggs which pass out in the manure and give rise to embryos, and these young worms develop in the manure to the infective stage, when they are ingested with food or water and pass to the intestine. From this point development varies with different species.

Strongylus vulgaris. The embryos burrow through the wall of the small intestine till they reach a blood vessel and are swept around in the blood; they finally attach, as a rule, in the anterior or great mesenteric artery and its branches, and develop to a form resembling the adult but without sexual organs, forming in the meantime aneurisms; the agamic form detaches and passes to the walls of the cecum, forming small abscesses or cysts which may be as large as a nut; finally these cysts open to the lumen of the cecum, setting at liberty the worms, which now copulate and repeat the cycle.

Strongylus equinus. The larvae are found principally in the parenchymatous organs, such as the liver, lungs and pancreas.

Strongylus edentatus. The larvae may be met with almost anywhere, especially under the serous membranes, the pleura and peritoneum.

Cylicostomum spp. The larvae are found in cysts, a half millimeter to 2 millimeters in diameter, in the mucosa of the large intestine, or at times free in the lumen. There are 3 types, the oesophagostomiform, the metastrongyliiform, and the embryonic.

The larvae of *S. vulgaris* determine aneurisms, as noted. If the worms leave and there is no reinfection, the aneurism organizes, but continues to present the constant menace of embolism and rupture. As an embarrassment to the circulation it may occasion intermittent lameness. It is a source of thrombo-embolic colic, which frequently terminates fatally. In the lungs these larvae occur as sharply circumscribed tubercles.

The larvae of species of *Cylicostomum* form cysts in the wall of the large intestine and in opening these form small sores. When numerous they cause thickening and induration, with impairment of function.

The adult worms have a toxic action due to a hemolytic which occasions a progressive anemia; the agamic *S. vulgaris* causes a mechanical thickening of the cecum walls by forming cysts or abscesses. Perforations, sometimes of considerable extent, may take place at the site of an abscess. Species of *Cylicostomum* attach to the intestinal mucosa, causing innumerable small sores which serve as portals of entry for pathogenic bacteria, a serious matter when coupled with the enfeebled, anemic condition and low resistance of the host animal. These bacteria enter the lymphatics and may be found in the mesenteric glands. From this bacterial invasion arises the febrile condition.

The lesions are congestive, inflammatory and verminous. There are simple ecchymoses on the mucosa, the serosa and in the muscular layer, and variable areas of congestion or capillary hemorrhage in the small intestine. In the large intestine and cecum there is a thickening due to connective tissue proliferation following the cysts and abscesses; these may become organized, cicatricial and sclerotic. Beside the verminous cysts or abscesses there are pimple swellings due to the puncture of the mucosa by the worm and the swelling due to inflammatory reaction. Aneurisms may occur in the anterior mesenteric and also in the occipital, pulmonary and uterine arteries. Glandular lesions seem to be almost constantly present, taking the form of infiltration of lymph glands, especially the mesenteric, the glands containing the micrococci habitually present as saprophytes in the intestines; at times abscesses form in these glands and rupture to the abdominal cavity. Miscellaneous lesions are anemia, emaciation, bacterial metastases, and intestinal or aneurismic rupture.

Diagnosis is based on the period of onset of the disease, its enzootic character, and the symptoms. The general symptoms are as already given; especial symptoms are the finding of the worms or their eggs and embryos in the feces and the determination of aneurism by rectal exploration. Prognosis is favorable under careful treatment, except for the accidents already noted.

Treatment is along the line of building up the resistance to repair the organic damage, the expulsion of the parasites, and the

combatting of complications. To build up resistance, Leneveu recommends the subcutaneous injection of a liter of artificial serum containing one-half to one gram of caffeine, once or twice a day; iron in the form of the arsenate; tonics, such as strychnine arsenate or sodium cacodylate; and digataline to replace caffeine when subcutaneous injections cease. To expel the worms, Leneveu recommends carbon bisulphide, in gelatine capsules, giving 2 to 5 grams, according to the size of the animal, every day for 5 days and following this on the sixth day with a purgative, preferably magnesium sulphate. This treatment may be repeated after 12 days. Secondary bacterial complications are combatted by the serum and caffeine and by tonics. If the heart shows signs of weakening, subcutaneous injections of camphorated oil are useful. For the colic he suggests tincture of opium with ether as a drench or morphine intravenously. For decubitus put the animal in slings. Abscesses may be treated with mild antiseptics when accessible. For severe diarrhea use powdered charcoal, bismuth, salol or benzo-naphthol. Milk, beginning with small amounts and increasing the amount to 8 to 10 liters a day, is the best adjuvant treatment.

Prophylaxis. Reinfection may be controlled by careful selection of pasture to avoid infection from food, and by using only pure potable water.

M. C. HALL.

G. LENEVEU

Rev. gen. d. med. vet., Toulouse, Dec. 15, 1915, v. 24 (288), pp. 593-612.

FRANCO-BELGIAN VETERINARY RELIEF FUND. It is reported that the Belgian and many of the French veterinarians are in a deplorable condition as a result of the war. A relief fund of 20,000 francs (about \$4,000) has already been raised among the over-taxed French veterinarians. Are American veterinarians interested?

The anti-tuberculosis bill of Dr. J. F. Winchester, of Lawrence, Mass. is arousing considerable public interest in that locality. At the first hearing of the bill, it is reported scant courtesy was allowed to its advocates. A second hearing has been granted at which it is expected a more favorable sentiment will develop.

ABSTRACTS FROM RECENT LITERATURE

ROCKY MOUNTAIN SPOTTED FEVER. A REPORT OF ITS INVESTIGATION AND OF MEASURES UNDERTAKEN FOR ITS ERADICATION DURING 1914. Fricks, L. D. *U. S. Public Health Rep.* 1915, Jan. 15, Vol. 30, No. 3, pp. 148-165.—This report is mainly concerned with the measures for the control and eradication of the disease in the Bitter Root Valley, Montana. A few of the tick eradicating measures are of general interest.

The destruction of small wild animals had a marked effect. At the beginning of the season three dipping vats were in operation. Horses, cattle and sheep were dipped in arsenical solution every ten to fourteen days, a total of 2,615 animals between April and June. Observations show that dipping is insufficient to eradicate the wood tick. Sheep-grazing is discussed at some length. Its advantage is no great labor or expense. Flocks of a thousand and five hundred sheep were used. They were searched for ticks and it was estimated that 25,000 were destroyed during the season, more than fifty times the number destroyed by the dip-pings. It is questionable if the same results can be obtained in other parts with different topographical features.

K. F. MEYER.

THE POISONOUS EFFECTS OF THE ROSE CHAFER UPON CHICKENS. George H. Lamson, Jr. *Conn. Agricultural College, Storrs, Conn. Abstracted from "Science", Vol. XLIII, No. 1100, Jan. 28, 1916, p. 138.*—"Serious losses have occurred each year during June and early July, from chickens having eaten the rose chafers (*Macrodactylus subspinosus*). These losses have often been ascribed to various causes, but close observations have shown that the chickens are very fond of eating these insects in large numbers, and post-mortem examinations have revealed the presence of many undigested insects in their crops. The crops are usually so full as to give the impression that death had been due to a "crop bound" condition of the chickens. Some have also supposed that these deaths were due to a mechanical injury of the crop by the spines on the legs of the insects having punctured the lining of this part of the digestive system, while others have accounted for the death of these chickens by the rose chafers having bitten the crops.

"A number of cases, some of which resulted in the loss of several hundred chickens, were reported to the writer and experiments in feeding rose chafers to chickens were taken up at the Storrs Agricultural Experiment Station in 1909.

"The deaths from this diet usually occurred in from nine to twenty-four hours after feeding. This led the writer to believe that undoubtedly death resulted from a cause other than a mechanical injury to the crop or "crop bound" condition. An extract was made from crushed rose chafers and distilled water, filtered, and fed to chickens in varying doses with a medicine dropper and this resulted in a great many deaths. Small chickens died in a few hours after feeding, older chickens of heavier weight when fed a small quantity of the extract lived but showed signs of poisoning; large doses resulted in their deaths. Mature hens did not die from the extract.

"From 150 to 200 chickens have been fed either with the rose chafers or with varying strengths of the extract to determine the weight of the chicken killed by a certain amount of poison, also to determine the age limit of the chickens killed."

"As nearly as the writer can determine, the rose chafers contain a neuro-toxin that has an effect upon the heart action of both chickens and rabbits and is excessively dangerous as a food for chickens.

"Owing to the fact that the insect feeds upon such a large number of plants, particularly on daisies, it seems essential that chickens be kept in mowed fields and away from yards having grape vines and any flowering shrubs during the month when the rose chafers are about, especially during the years when rose chafers are particularly abundant."

REICHEL.

ENTAMEBIC DYSENTERY IN THE DOG. Darling, S. T. *Proceedings of the Medical Association of the Isthmian Canal Zone*, 1915, Vol. VI, part 1, pp. 60-62.—The first case of a naturally acquired case of amebic dysentery in the dog is described.

The hound was used for hunting deer and had been brought from Mississippi to the Canal Zone. Inasmuch as he was badly infected with hookworm, he was kept under observation. Frequent, bloody, mucous stools accompanied by tenesmus and great pain and progressive emaciation, were noted. During life the trophozoites of entameba could be demonstrated periodically. At autopsy

the entire colon was found to be the seat of minute, red, punctate erosions of the mucosa; only these focal necroses—no ulcers—were found. The intervening mucosa was pale yellow and edematous. Smears contained entamebas, some of which contained erythrocytes.

Microscopically, the lesions are unlike those caused by experimental infection with human pathogenic entamebas, and there are also morphological differences in the trophozoites of the entamebas. In case it is proven by further observations that the entameba found in the dog is a new species, the name *Entameba venaticum* is proposed.

One should bear in mind, however, the possibility of dogs acting as carriers of entamebic dysentery, and be on guard against them.

K. F. MEYER.

ON THE USE OF CERTAIN ANTISEPTIC SUBSTANCES IN THE TREATMENT OF INFECTED WOUNDS. H. D. Dakin. *British Medical Jour.*, pp. 318-320, August 28, 1915. Also in *La Presse Médicale*, pp. 377-9, September 30, 1915.—In order to make a judicious choice of the antiseptic most likely to give useful results in the treatment of infected wounds many different factors have to be considered in addition to germicidal activity, including the irritating properties of the substances, their toxicity, solubility, ability to penetrate tissues and be absorbed, and their chemical reactions with proteins and other tissue constituents.

In judging of the antiseptic action of a substance suitable for the treatment of wounds, it is essential that its germicidal action be tested against microorganisms mixed with blood serum or similar substances, and not simply tested against bacteria suspended in water. The germicidal activity of all known antiseptics is greatly reduced by the presence of blood serum or similar substances, and in some cases this reduction is so great that the compound loses all practical antiseptic value.

Mercuric chloride is probably the least useful and most objectionable as an antiseptic for the treatment of infected wounds. Phenol (carbolic acid) is characterized by a very low germicidal power especially when acting in the presence of serum. When used in sufficiently high concentration for germicidal efficiency, it is decidedly destructive of healthy tissue. Hydrogen peroxide must be regarded as of slight value.

SODIUM HYPOCHLORITE has high germicidal action, and has many other desirable properties. It has been possible to prepare a simple hypochlorite mixture which maintains approximate neutrality under all conditions, is practically non-irritating, and which, when properly applied, has given most encouraging results in the antiseptic treatment of wounds.

Preparation of solutions.—The preparation of a solution of suitable concentration for direct application, containing 0.5 to 0.6 per cent of sodium hypochlorite, may be carried out very simply as follows: One hundred and forty grams of *dry* sodium carbonate (Na_2CO_3), or 400 grams of the crystallized salt (washing soda), is dissolved in 10 liters of tap water, and 200 grams of chloride of lime (chlorinated lime, bleaching powder) of good quality is added. (Do not use calcium chloride). The mixture is well shaken, and after half an hour, the clear liquid is siphoned off and filtered through a plug of cotton. Forty grams of boric acid (sometimes called boracic acid) are added to the clear filtrate, and the resulting solution is ready for use. A slight precipitate of calcium salts may slowly occur, but it is of no significance. The solution should not be kept longer than one week. *The boric acid must not be added to the mixture before filtering, but afterwards.*

A stronger solution may be prepared by decomposing 150 grams of chloride of lime, with 105 grams of sodium carbonate, dissolved in a liter of water. The mixture is filtered and a measured portion (20 c.c.) is rapidly titrated with a boric acid solution (31 grams per liter) until the mixture is acid to an aqueous (not alcoholic) suspension of phenolphthalein. From this titration, calculate the amount of solid boric acid to be added to the rest of the filtrate. An excess of boric acid should be avoided; it is best to add slightly less than the calculated amount.

The concentrated solution thus prepared contains about 4 per cent of sodium hypochlorite, and should be mixed with 6 parts of water before use. It can be kept for a month without serious decomposition.

Application and Results.—To obtain the best results it is essential to commence the antiseptic treatment of the wound at the earliest moment possible, and to bring fresh quantities of the antiseptic solution in contact with all parts of the wound as frequently as possible for a considerable period of time. To give some idea of the quantities of solution employed (for man); 5 to 10 c.c. may be

introduced every two hours by means of rubber tubes into small wounds, using a pipette or syringe, while for the irrigation of such wounds as fractured femurs, accompanied by much destruction of tissue, as much as 1 or even 2 liters a day may be employed. The dilute solution, prepared as described may be used in large quantities for the continued irrigation or instillation of wounds for more than a week without producing visible irritation. As a wet dressing the solution may be used almost indefinitely. The solution is actively hemolytic and must not be injected intravenously.

Hypochlorites are extremely active substances chemically, and they should not be used in conjunction with other antiseptics, nor with alcohol or ether.

It is believed that the solution previously described, when properly applied to all parts of the wound, gives better results than can possibly be obtained from powdered preparations of partially soluble materials. Generally speaking, the experiments with powdered substances have given much poorer clinical results than have aqueous solutions.

For the clinical side of the above work, carried out in the laboratories at Compiègne (France) under the auspices of the Rockefeller Institute for Medical Research, see paper by Carrel.

The great success attending the use of this old antiseptic recently brought into prominence would justify its extended use in veterinary surgery in order that its merits may be determined for the veterinarian.

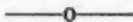
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POLYPUS OF THE LARYNX. Doct. Luigi Menicagli. *Il Nuovo Ercolani*.—In a calf, there was a polypus, situated on the left side of the epiglottic cartilage at the mucous fold of the base. It had, for ten months, caused frequent spells of coughing, accompanied with phenomena of suffocation. The cough taking place principally during the deglutition of either solid or liquids was followed with rejection of the food. With great difficulty the author succeeded in his exploration of the larynx per mouth and found the growth as big as a bean with a long peduncle, which allowed it to be displaced by the movements of deglutition and its dropping in front of the larynx, producing a temporary occlusion of the parts. The removal of the growth was comparatively easy. The mouth was kept widely open with a speculum, the tongue depressed on one side, the polypus taken hold of with a pair of forceps with long

branches and torsion separated it from its epiglottic attachments. The hemorrhage that followed was of no importance.

A. LIAUTARD.



A FURTHER CONTRIBUTION TO THE KNOWLEDGE OF THE SHEEP DISEASE HEMORRHAGIC SEPTICEMIA, AND ITS CONTROL BY SERUM VACCINATION. H. Raebiger, A. Spiegel and K. Schern. *Deut. Tier. Wchensh.* 1915.—A specific serum was obtained from three sheep which had been given repeated intravenous injections of a virulent strain of the *Bacillus ovisepcticus*. The testing of the serum was carried out in the following manner: white mice after being inoculated subcutaneously with 1 c.c. of virulent 24-hour bouillon culture were injected intraperitoneally with doses of .2 c.c. and .3 c.c. of serum. The animals so treated were protected while the controls which received only the culture died.

In 13 large herds in which the disease was present the serum treatment gave very promising results. About half of the animals sick at the time of treatment recovered, and the spread of the disease among the healthy sheep was checked.

The serum was administered intravenously in doses varying from 5 c.c. to 10 c.c., the sick animals receiving the larger amounts.

A record of a case in a lamb held under observation for 26 days was kept. The symptoms first noticed were the poorly nourished condition, debility, uncertain, staggering gait, loss of appetite, at times a grinding of the teeth was heard, and there was a peculiar manner of holding the head such as is seen in "turn-sickness" of sheep. Later there was a serous discharge from the nose and eyes, swelling of the carpal and tarsal joints and a paralytic condition of the hind quarters. The specific microorganism was present in the eye and nose discharges.

On the 18th day after the beginning of these observations an improvement in condition appeared which continued until the 25th day, when a decided relapse occurred. There was great weakness, shallow and accelerated respirations, and the animal was unable to stand. It was killed on the following day.

The chief points of interest in the autopsy were the greatly emaciated condition of the carcass with a watery infiltration of the subcutaneous connective tissue and the appearance of grayish-yellow nodules varying in size from a lentil to a hazel nut, scattered over the surface, and in the deeper parts of the lungs. On sec-

tion these nodules are seen to contain a grayish-yellow, dry, cheesy material with softened centers, from which a creamy, greenish-yellow liquid may be pressed. They are set off from the healthy lung tissues by a grayish-brown connective tissue capsule. The *Bacillus ovisepticus* was found in these lesions.

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OESOPHAGEAL OBSTRUCTION—OESOPHAGITIS FOLLOWING. Doct. G. Del Seppia. *Il Nuovo Ercol.*—Having partaken too gluttonously of a meal of bran and potatoes mixed, an eight year old horse showed all the symptoms of choking, which was easily diagnosed. The test of drinking water, eating, slobbering, swelling in the oesophageal region, the case was complete. Catheterism of the esophagus was then attempted with a long urethral catheter. It was readily introduced into the esophagus until arrival at the point where the swelling was observed on the outside of the neck, resistance was felt. Moderate, gradual pressure pushed it through the mass and suddenly the horse reared and the catheter pulled away. Drink was then offered, taken and swallowed with a little difficulty and it was thought that perhaps the obstruction had not been pushed into the stomach because of the catheter being too short. The next day with a two meter tube of hard rubber the catheterism was successfully performed. For a few days the animal seemed to have some trouble in deglutition but after that, recovery was complete.

A. LIAUTARD.

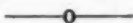
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BACTERIAL INFECTION AS A CAUSE OF RHEUMATISM AND ITS TREATMENT. F. E. Stewart. *Mulford's Digest.*—The term "rheumatism," defined as "an indefinite something induced by cold and exposure, always affecting either muscle or joint, and with pain on motion as a prominent symptom," has been much abused and sadly over-worked.

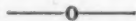
The researches of Poynton, Payne and Rosenow have done much to establish our knowledge of infectious arthritis including its cardiac and other complications.

For the treatment of streptococcic rheumatism a polyvalent bacterin may be employed prepared from different strains of streptococci isolated from rheumatic cases, or a mixed or combined bacterin may be selected containing pneumococci, staphylococci and streptococci.

Success in the bacterin treatment of rheumatism is largely dependent upon proper attention to Wright's directions in regard to accessory treatment. Wright calls attention to the fact that failure may result if proper circulation is not secured in the infected area. Nature walls off the infected area to the best of her ability to quarantine it from the rest of the body. Frequently this wall greatly hinders the circulation of the blood in the part infected by living microbes, thus presenting a serious obstacle to bacterin treatment. Methods for producing hyperemia are therefore, often necessary.



MORTIFIED PROLAPSUS RECTI—REDUCTION—OPERATION—RECOVERY. Doct. G. Del Seppia.—A very young donkey had prolapsus of the rectum for several days. It was 35 centimeters long, forming a protrusion red in color. It had appeared after work. The author reduced it at once after cleaning, with lysoform. The prolapsus having returned a second time, pressure was applied against the anus with the tail, which was secured tightly with a surcingle. Finally the prolapsus returned a third time, worse than before and the mucosa of the rectum was soiled with feces, bleeding here and there and with excoriations and gangrenous spots. The treatment followed after the administration of chloral by rectum, was the introduction of a wooden tube, 25 centimeters long, 4 centimeters wide into the rectal vestibulum and held by an assistant. Another assistant pulled the rectum over the tube and as near as possible to the anus. It was then secured with an elastic ligature and 3 centimeters from the anus, the prolapsed portion of the rectum was amputated, and sutures were applied to unite the intestinal stump to the anus. The animal manifested a little pain towards the end of the operation. The wooden cylinder was removed. Careful liquid diet was recommended and after a few days the donkey had entirely recovered. A. LIAUTARD.



CHONDRO-SARCOMATOUS GROWTH. Dr. Luigi Menicagli. *Il Nuovo Ercol.*—This occurred in an eight year old cow, far advanced in pregnancy. She had been affected for two months with difficult respiration, while at work. The animal presented the unique symptom of loud breathing, which became so pronounced that the owner who at first overlooked it, finally called on the author for advice.

The difficulty in breathing was manifested by a loud noise,

which sounded as if there was some impediment to the passage of the air through the nostrils. On examination of that portion of the face, there was found on the right side, a round tumor close to the lower angle of the nostril, smooth on its surface, ulcerated in two places and adherent to the cartilaginous septum of the nose. This growth was hard, not painful and to all appearance seemed to be part of the cartilage. The removal was performed with the bistouri. Abundant hemorrhage was arrested with thermo-cautery and recovery was complete after a few days. The examination of the growth showed its nature to be that of a chondro-sarcoma. A. LIAUTARD.

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INVESTIGATION INTO THE DISEASE OF SHEEP CALLED "SCRAPIE"; WITH SPECIAL REFERENCE TO ITS ASSOCIATION WITH SARCOSPORIDIOSIS. T. P. M'Gowan, *1 Vol., pp. 12-116, Edinburgh, 1914.*—In a very extensive, well illustrated monograph M'Gowan has treated the subject in a splendid manner, and it is barely possible to consider the publication in a brief abstract. It is the result of an investigation which the author has undertaken at the suggestion of a commission which was appointed for the purpose of determining the cause of the enormous losses created by the disease in Ecosse County.

Clinically, the sheep show at the preferable age of two years a persistent pruritus with cutaneous eruptions; gradual emaciation; without diarrhea and loss in appetite; marked incorrelated locomotion (paralysis, trotting movements; lameness, etc.) The disease is always fatal.

M'Gowan thinks that "Serapie" is the result of an infection with sarcosporidia, for the following reasons:

(1): Sarcosporidia are always present in the skeletal muscles of sheep suffering from "scrapie". The number is proportionally larger in advanced than in earlier cases.

(2): The pruritus, the main symptom of the disease, can be easily reproduced in the rabbit by injections with an emulsion of sarcosporidia.

(3): The clinical examination of atypical cases also reveals that the paralyzes are, in all probability, the result of primary lesions of the muscles.

(4): The autopsy—aside from an intensive invasion with sarcosporidia—is absolutely negative.

(5): No other hypothesis permits a better or more simple explanation as to the symptoms and the evolution of the disease.

"Scrapie" is hereditary on account of congenital infection. Numerous chapters are devoted to the discussion of the evolution of the sarcosporidia, the sarcosystine, etc.

So far, no treatment has been successful; the best method (on account of the hereditary transmission) consists in progressively replacing the ewes in infected herds by young female sheep from clean herds.

K. F. MEYER.

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PATHOLOGICAL INVESTIGATIONS INTO LAMZIEKTE. REPORT TO THE MINISTER OF AGRICULTURE, 1914. E. Hedinger, *Dec. 1915; Pretoria, Gov. Printing and Stationery Office*.—The nature of this disease in cattle, (resembling the foregoing discussed malady in sheep) which is very common in South Africa, causing heavy losses annually, has remained unknown, in spite of all the costly experiments which were undertaken by Theiler to support some of his elaborate hypotheses which he discussed in his article "Historical sketch of the investigations into lamziekte". (Report of Department of Agriculture. Union of South Africa. 1913-1914; pp. 123-129).

The work of Hedinger in this connection shows again clearly how fundamentally important and valuable a careful histopathological investigation will prove to the investigators of an unknown disease. If he lacks the basic knowledge of this science, or does not appreciate the efforts of his collaborators to study the disease anatomically, he involuntarily has to resort to speculations.

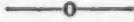
Prof. Hedinger, of the Medical Faculty of the University of Basel, (Switzerland), has been invited by the Department of Agriculture, Union of South Africa, to study the disease—after Theiler had blocked all the attempts of the various pathologists who worked in his laboratory to obtain the necessary material for a careful study of "lamziekte".

In 52 cases examined, Hedinger found degenerative lesions in the muscles, inflammatory changes in the nerves, and sarcosporidia. The correlation of these findings is expressed by the author in the following paragraph:

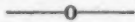
"Lamziekte is a disease which is very well characterized by histological changes of the cross-striated muscles, and in most cases of the nervous system, and by the presence of sarcosporidia. Although, owing to the incomplete knowledge of the sarcosporidia it is still not possible to prove experimentally the importance of the sarcosporidiosis for the lamziekte, it is quite possible, taking into consideration

the facts that are known about sarcosporidia, that these protozoa are the cause of lamziekte. The sarcosporidiosis explains without difficulty the whole nature of lamziekte. Be it that the sarcosporidia are or are not responsible for lamziekte, in all further investigations the question of the importance of sarcosporidia must have the first place".

K. F. MEYER.



VERMINOUS THROMBOSIS OF THE MESENTERIC ARTERY CAUSES INTESTINAL OBSTRUCTION. Major Veterinary Cocu. *Bull. de la Soc. Cent.*—A stallion seven years of age, had generalized mange. He was in a very bad physiological condition. Notwithstanding every care and a ferocious appetite, while his skin disease was improving, he was still in a miserable condition and lost flesh. He only weighed 395 kilos. He still had a lively glance of the eye, his actions were always quick and well preserved, but the muscular emaciation was such that once when he was lying down he needed help to get up. An edematous swelling of the testicular region made its appearance, the loss of flesh was more accentuated, the horse was destroyed by military order. Post mortem. No essential lesions were found except in the right fasciculus of the mesenteric artery and its terminal branches. The coats of the intestines were pale and the mucous membrane showed little nests of embryos of sclerostomas and adult worms were found in great quantity. The right fasciculus of the artery was represented by a thick cord as big as the finger with indurated walls. Its cavity was contracted and partly obliterated by fibrinous clots and masses of worms. Under the colic and cecal serous covering, there were many old calcified emboli and also many capillaries were obliterated and transformed into small calcareous cylinders. All the other organs were healthy. A. LIAUTARD.



TWINNING IN CATTLE, WITH SPECIAL REFERENCE TO THE FREE MARTIN: Leon J. Cole, *Science*, Vol. 43, p. 177, 1916.—A study of 303 multiple births in cattle, the records of which were obtained directly from breeders. Any female calf twinned with a male is referred to as a free martin. From a consideration of certain theoretical biological factors, Cole concludes that some free martins should be fertile while others are sterile. It was found that both classes exist. The work was done at the College of Agriculture of Wisconsin.

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RADIUM MUD IN SYNOVITIS AND TENDINITIS. Veterinary Major Marshall, *Bulletin de la Soc. Cent.*—1st observation. Articular and tendinous synovitis—Six year old mare, Henrietta, had no history but yet she showed cicatrices of distemper abscesses in the inter-maxillary space. After some little time, she became lame in the right hind leg with articular synovitis. Revulsive treatment and blisters gave no relief. The fetlock became involved, the metatarsophalangeal tendinous synovials were also diseased. For several months the mare was unable to do any work and became emaciated. The author then suggested the application of poultices made of radium mud.

From the first application round the fetlock, the mare manifested some relief. The swelling remained the same but the parts were not so painful nor so warm. A second application was made, and twenty-four hours after the mare could put her foot flat on the ground, and rested on it, the pain was considerably reduced to the touch, and lameness so far gone that the mare could be made to trot. Radio-active baths were ordered alternatively with the poultices. After ten days of that treatment the recovery was complete.

2d Observation. Tendinitis of the perforans tendon. Becoming suddenly lame in the right fore leg, the mare Falaise became disabled and not likely to be ridden for a while, much to the annoyance of her owner, who was going to manoeuvres in a few days. There was no doubt that at least nearly two months treatment would be required. She was treated with radium mud and after five days of direct applications of poultices and with radio-active baths, the mare was able to resume her work.

A. LIAUTARD.

LA REAZIONE DI BORET-GENGOU NELLA ROGNA DEMODECTICA DEL CANE. THE BORDET-GENGOU REACTION IN THE DEMODECTIC MANGE OF THE DOG). G. C. Sparapani. *Il Moderno Zoiatro*, 1915, May 30th; pp. 211-218.—It was demonstrated through the work of Gmeiner and Mettam that the *Staphylococcus aureus* is the most important factor in the pustular form of demodectic mange, and Alessandrini therefore stated that the demodex folliculorum has no pathogenic action on the host. The author, in attempting to form his own opinion on the subject, investigated several cases of mange by means of the complement fixation test and found that the blood of the affected dogs contained specific antibodies for the *Staphylococcus albus*. Positive reactions were noted only in dogs which

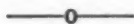
showed microscopically the cocci in the pus of the pustule contents. Negative results only were obtained with the serum of healthy animals and with that of dogs in which the pathological process was only caused by the mites. The reaction is, therefore, specific.

The staphylo-mycosis is not characteristic for follicular mange inasmuch as in other skin affections a similar invasion with staphylococci can take place.

Sparagini failed to find specific antibodies against the demodex by using macerations of parasitized skin particles as antigens.

The results prove the contention of Alessandrini that the demodex is non-pathogenic.

K. F. MEYER.



EXPERIMENTAL WORK. HOG CHOLERA SERUM AND VIRUS. REPORT OF THE VETERINARY DEPARTMENT. R. A. Craig. *Twenty-eighth Annual Report of the Purdue University Agricultural Experiment Station, Lafayette, Indiana.*—In order to determine the effect of heat on the potency of anti-hog-cholera serum, different lots of serum were heated in a water bath. The temperature to which the serum was heated varied in the different experiments and excepting in the first, both unheated and heated serum from the same lot was used in vaccinating the experimental pigs. The following table gives the number of experiments and a summary of the data of each test:

No. experiment	Temperature serum heated	Low dose pigs	High dose pigs	Pigs receiving unheated serum	Virus pigs	Result
I	40.5 degrees C. 1 hour	3	3		2	Serum potent
II	40.5 degrees C. 1 hour	3	2	2	2	Serum potent
III	50.0 degrees C. 1 hour	3	3	2	2	Serum potent
IV	50 to 53 degrees C. 1 hour	3	3	2	2	Serum potent
V	55 degrees C. 1 hour	2	2	2	2	Serum potent
VI	55 degrees C. 1 hour	2	2	2	2	Serum potent
VII	58 degrees C. 1 hour	2	2	2	2	Serum potent

We were able to note the condition of a few of the pigs that were vaccinated with the heated serum several weeks after they had been released from the test, and it was noted that they did not thrive well. However, it could not be determined that the heated serum was responsible for their condition.

In Experiments I and II the serum (defibrinated blood) was carbolized before heating, and could not be heated to a higher temperature than 40.5 degrees C. without becoming thickened and coagulated. In the other experiments the preservative was added after heating.

An experimental vaccine was made by mixing hog-cholera blood and anti-hog-cholera serum together and heating the mixture in a water bath. Five-tenths of one per cent. carbolic acid was added as a preservative. The experimental vaccine was then tested by injecting into pigs weighing about fifty pounds. The following table gives a summary of the tests:

No. experiment	Per cent. virus	Per cent. serum	Amount injected	Result
I	80	20	1 c.c.	Failed to protect
II	70	30	1 c.c.	Failed to protect
III	60	40	1-2 c.c.	Failed to protect
IV	50	50	2-4 c.c.	Failed to protect
V	50	50	2-4 c.c.	Failed to protect
VI	40	60	2-4 c.c.	Failed to protect

Exposure check pigs that were not given the experimental vaccine were present in all of the lots. In from a few days to three weeks the pigs were subject to pen exposure, or inoculated with virus. One check and one vaccinated pig survived. As the pigs receiving the experimental vaccine lived about the same number of days as the checks, no immunity was conferred. REICHEL.

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ECHINOCOCCUS CYSTS IN THE LUNGS CAUSE PNEUMOTHORAX IN A COW. Henry B. Eve, M. R. C. V. S. *Veter. Journ.*—Aged cow in poor condition, bought at auction sale, was fed like the other cows, which were in a good condition. She kept away. She was dull, listless, with pale mucous membranes, had a discharge from eyes and nostrils, coat was staring, appetite capricious, gave very little milk which was watery, pulse was weak, breathing accelerated, temperature sub-normal. Auscultation revealed pneumothorax on both sides. She had a hacking cough, which was noticeable in the morning. The abdomen was relaxed and sometimes constipated.

Chronic emphysema was diagnosed. Tuberculin test was applied and was negative. Treatment consisted in tonics of all kinds. No improvement and death followed.

Post mortem: Numerous echinococcus cysts of the multilobular variety were found in the lungs. One was near the base of the right lung and had burst allowing the air to escape from the lung.

A. LIAUTARD.

ARMY VETERINARY LEGISLATION

It is strange that the practical soldiers of the General Staff and the Secretaries of War should be so slow to recognize the true worth of our profession and the great work that is now being done by the Army Veterinary Corps of the French, English, Italian, and the little known, but, surely efficient German army veterinarians. The latter being compelled to carefully conserve their horses on account of the actual blockade against imports.

However indifferent and cold the officers of our mounted (Artillery and Cavalry) service may have been in the past, I can see and hear much that shows a trend of opinion in our direction.

At a University banquet in Washington this winter a Major of Field Artillery emphatically stated that he was a radical believer in giving the veterinarian commission with rank in our army.

For the first time in the history of the American Army a veterinarian has been sent abroad to observe the work of the allied forces in France and he was the veterinarian whose work had molded the opinion of the officer quoted.

Both the upper and lower Houses of the 64th Congress now in session have bills preparing to give veterinarians advanced standing.

The first and most important one is known as the Hay bill (H.R. No. 12766, Union Calendar No. 92).

This bill in relation to its veterinary feature was similar to the one passed unanimously last year by the House after the great work of my predecessor on the legislative committee.

At this writing it is now on the Union Calendar and will follow the consideration of the Free Sugar bill.

The Senate bill (S. 4840) is called the Chamberlain bill.

CHAMBERLAIN BILL

SEC. 17. VETERINARIANS.—The President is authorized to appoint and commission by and with the advice and consent of the Senate, veterinarians at the rate of two for each regiment of Cavalry, one for each battalion of Field Artillery and mounted Engineers, and twenty-four for the Quartermaster Corps. Veterinarians thus appointed shall have the pay and allowances of second lieutenants, Veterinarians who have served seven years as such shall, subject to such examinations as the President may prescribe, have the pay and allowances of first lieutenants. Veterinarians who have served more than fifteen years as such, shall, subject to such examinations as the President may prescribe, have the pay and allowances of captains. Veterinarians who have served more than fifteen years as such shall,

subject to such examinations as the President may prescribe, have the pay and allowances of majors: *Provided*, That the total number of veterinarians with pay and allowances of majors shall not at any time exceed fifteen.

HAY BILL

SEC. 17. That the President is hereby authorized, by and with the advice and consent of the Senate, to appoint veterinarians and assistant veterinarians in the Army, not to exceed, including veterinary officers in service, two such officers for each regiment of Cavalry, one for every three batteries of Field Artillery, seventeen as inspectors of horses and mules and as veterinarians in the Quartermaster Corps, and seven as inspectors of meats for the Quartermaster Corps, and said veterinarians and assistant veterinarians shall constitute the Veterinary Corps and shall be a part of the Medical Department of the Army.

That hereafter a candidate for appointment as assistant veterinarian must be a citizen of the United States, between the ages of twenty-one and twenty-seven years, a graduate of a recognized veterinary college or university, and shall not be appointed until he shall have passed a satisfactory examination as to character, physical condition, general education, and professional qualifications.

That an assistant veterinarian appointed under this Act shall, for the first five years of service as such, have the rank, pay, and allowances of second lieutenant; that after five years of service he shall have the rank, pay, and allowances of first lieutenant; that after fifteen years of service he shall be promoted to be a veterinarian with the rank, pay, and allowances of captain: *Provided*, That any assistant veterinarian, in order to be promoted as hereinbefore provided, must first pass a satisfactory examination, under such rules as the President may prescribe, as to professional qualifications and adaptability for the military service; and if such assistant veterinarian shall be found deficient at such examination he shall be discharged from the Army with one year's pay.

That the veterinarians of Cavalry and Field Artillery now in the Army, together with such veterinarians of the Quartermaster Corps as are now employed in said corps, who at the date of the approval of this Act shall have had less than five years' governmental service, may be appointed in the Veterinary Corps as assistant veterinarians with the rank, pay, and allowances of second lieutenant; those who shall have had over five years of such service may be appointed in said corps as assistant veterinarians with the rank, pay, and allowances of first lieutenant; and those who shall have had over fifteen years of such service may be appointed in said corps as veterinarians with the rank, pay, and allowances of captain: *Provided*, That no such appointment of any veterinarian shall be made unless he shall first pass satisfactorily a practical professional and physical examination as to his fitness for the mili-

tary service: *Provided further*, That veterinarians now in the Army or in the employ of the Quartermaster Corps who shall fail to pass the prescribed physical examination because of disability incident to the service sufficient to prevent them from the performance of duty valuable to the Government shall be placed upon the retired list of the Army with seventy-five per centum of the pay to which they would have been entitled if appointed in the Veterinary Corps as hereinbefore prescribed.

That the Secretary of War, upon recommendation of the Surgeon General of the Army, may appoint in the Veterinary Corps, for such time as their services may be required, such number of reserve veterinarians as may be necessary to attend public animals pertaining to the Quartermaster Corps. Reserve veterinarians so employed shall have the pay and allowances of second lieutenant during such employment and no longer: *Provided*, That such reserve veterinarians shall be graduates of a recognized veterinary college or university and shall pass a satisfactory examination as to character, physical condition, general education, and professional qualifications in like manner as hereinbefore required of assistant veterinarians; such reserve veterinarians shall constitute a list of eligibles for appointment as assistant veterinarians subject to all the conditions hereinbefore prescribed for the appointment of assistant veterinarians.

That candidates for appointment as assistant veterinarians who shall have passed satisfactorily the examinations prescribed for that grade by this Act shall be appointed, in the order of merit in which they shall have passed such examination, to vacancies as they occur, such appointments to be for a probationary period of one year, after which time, if the services of the probationers shall have been satisfactory, they shall be permanently appointed with rank to date from the dates of rank of their probationary appointments. Probationary veterinarians whose services are found unsatisfactory shall be discharged at any time during the probationary period, or at the end thereof, and shall have no further claims against the Government on account of their probationary service.

That the Secretary of War shall from time to time appoint boards of examiners to conduct the veterinary examinations hereinbefore prescribed, each of said boards to consist of three medical officers and two veterinarians.

A comparison of the two will readily show that the Hay bill has our endorsement.

The confusion and delay in Congress on measures of national security are disquieting to the public and only such occurrences as the Columbus raid and massacre seem to stir up action.

The military affairs committees have been working independently and in some cases at cross purposes.

Their work will have to be done over again by Congress as a whole unless financial considerations are to be cast to the winds.

On the fundamental question of reconstructing the army there is such wide difference that a long struggle is possible. Right here is where our section 17 of both bills will be in the thick of the fight, especially in the Senate.

We expect little or no opposition in the House bill.

After two and a half months of committee work the chairmen wish to have their recommendations promptly acted upon.

The emergency defense bill raising the army strength to 120,000 was rapidly passed by both houses.

It is doubted in some quarters that Congress will be able to devise and fill out a comprehensive and coherent system of national defense within a year or two.

Certainly the lack of information shown by the law makers is in many instances very deplorable. Committees alone possess the information obtained at hearings and from department heads and their chairmen hold the respect of Congress on account of this knowledge of the subject being considered.

Right here is where our great friend, Hay, of Virginia, does his best for the Army veterinarian.

He knows full well the need of rank and authority and responsibility for our men and when he gives Congress his word that this must be a part of the new defense bill we feel more confident than ever, that it will pass.

It seems almost impossible of belief that after having had civil and foreign war experiences of our own, and with the daily object lesson of the European battle fields, Americans generally and their legislators in particular, should be so indifferent to our possible fate if unprepared.

When we stop in our mad rush for riches and luxury and ponder over our gigantic size and its helplessness, except to gain greater size and wealth, it is time to listen and reflect "on the first requisites to national defense without which we would be helpless."

Of course both bills cannot become law but must be referred to a conference committee composed of the two chairmen and three members each from the Senate and House.

DAVID E. BUCKINGHAM,

Chairman Legislative Committee.

[Just as this form is closing, news comes that the bill has passed the House.—Editor.]

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

(Continued from page 783, March issue)

We further recommend that when an institution has failed for a reasonable period (in the judgment of this committee but not more than two years) to comply with what the committee deems important criticisms, and has made no material progress toward correction of the fault, then and thereafter such criticism shall be presented in open meeting and published in reports until such faults have been corrected or the association as a whole has had opportunity to consider and act on such criticisms.

SPECIAL INSTRUCTION:—We recommend that veterinary colleges not already doing so should adopt a definite plan of giving instruction to older students concerning professional business matters and including accounts, collections, dealing with the patron, professional ethics, public responsibilities and opportunities for service, etc.

RESPONSIBILITY FOR STUDENTS WELFARE:—We renew previous recommendations that veterinary colleges in general should definitely recognize their responsibility for social and moral welfare of the students just as other colleges do and make suitable provision looking to that end.

VETERINARY COLLEGES FOR RECOGNITION 1914-15:—It should be understood that our report in this connection has no bearing upon the colleges which have been recognized by the association in the past, but which are not now in active service.

We have already in this report called the attention of the association to the fact that a considerable number of previously recognized veterinary colleges have operated during the year 1914-15 in violation of section 2, article VIII. by-laws 1913, particularly regulations XI, XII and XIII relating to faculty, alumni, and requirements for certain specified major subjects, also in violation of section 3, of the same article relating to a matriculation requirement of one year high school or its equivalent. In some cases, the violation has been only of section 2, in most cases the violation has been of both sections 2 and 3.

This puts before our association a serious question concerning the position of a very large number of matriculants of the year 1914-15 with regard to eligibility for membership in this association.

Having these minor defects in mind, the committee have decided to suggest to the association that this condition is so general and the attention of all the schools being called to it in a very positive manner in the criticisms that the committee have made of the colleges, that we believe the matter will be taken care of in the future, by those colleges that have apparently overlooked this requirement.

The list of schools to be published for recognition in the forthcoming report will be determined by the action of the association and will be automatically constituted if the committee report concerning schools found not in violation be accepted and considered in connection with action of the association with reference to schools listed as in violation of by-law requirements.

UNIFORM MATRICULATION REQUIREMENTS:—Still under this general heading of recommendations we would respectfully call attention to the desirability of uniform matriculation requirements by the American Veterinary Medical Association, the Federal Department of Agriculture, and Civil Service Commission. Looking to this end the chairman of your committee has had some correspondence with these two bodies with encouragement that the question will be carefully considered. In fact, some progress has already been made apparently as a result of this correspondence.

A report has just been received from Mr. John McIlhenny, President of the United States Civil Service Commission under date of August 11th, advising us that after a conference with the Secretary of Agriculture that regulation I of the regulations governing entrance to examination for the position of veterinary inspector, Bureau of Animal Industry, Department of Agriculture, has been amended to read as follows, to become effective at the beginning of the 1916-17 session of veterinary colleges:

"1. A matriculation examination shall be adopted by each veterinary college, the minimum requirements of which shall be equivalent to the first grade examination as published in the United States Civil Service Manual of Examinations. Such examination will therefore comprise:

1. Spelling
2. Arithmetic
3. Penmanship
4. Report writing
5. Copying and correcting manuscript
6. Geography and civil government of the United States.

2. An applicant having a diploma from a recognized college or normal or high school, or a first-grade teacher's certificate, shall be eligible for admission to a veterinary college without examination.

It is not deemed advisable to make this amendment effective at once, as colleges have already made their arrangements for entrance classes for the coming school year.

By direction of the commission:

Very respectfully,

J. A. McILHENNY, President."

Our governmental authorities could hardly be expected to come to any unusual standard required by this association unless that standard fitted closely to their needs. But, on the other hand our association could easily modify its standards so as to harmonize with theirs, providing they are willing to adopt satisfactory elevations of matriculation requirements.

We recommend that this association should now take definite steps and make persistent effort to bring about uniformity of requirements by these bodies, either by appointment of a special committee or special authorization of an existing committee.

The chairman of this committee now offers as a motion that this report be referred to the executive committee for consideration of its recommendations.

Committee:

GEO. W. DUNPHY

P. H. BROWNING

M. H. REYNOLDS, Chairman.

COMMENTS

We deem it wise to call attention of this association to certain features of American Medical Association work.

First, that this association maintains a permanent "Council on Medical Education" as a rather stable body, term of membership, five years, one member retiring annually.

A. M. A. maintains very close college inspection and is very exacting in its requirements.

The A. M. A. asks for a specified number of thoroughly trained specialists on laboratory branches, giving entire time to instruction and research work, anatomy being included as one of the laboratory subjects.

The A. M. A. is insisting more and more on abundant hospital facilities and clinical opportunities and the use just as far as possible of the laboratory method of teaching.

The A. M. A. insists on the need of good library facilities, specifying quite definitely number and character of periodicals, housing, accessibility, etc.

The A. M. A. adopted several years ago a classification of medical colleges into four clearly defined groups, grading medical colleges (and publishing) somewhat as a modern city dairy inspector might grade dairies and publish official gradings.

What would the American Veterinary Medical Association think of this plan? Your committee does not think it best to make recommendation to this effect at present but would very much appreciate the benefit of a free discussion.

RECOMMENDATIONS

MATRICULATION:—In our last recommendations (see proceedings for 1913) we urged the desirability of steady and reasonably rapid improvement in matriculation requirements in order that our profession may come up as rapidly as possible to the matriculation requirements of other professional colleges. This recommendation we now renew. To illustrate this point concerning our present inadequate matriculation examination and requirements the following is submitted. This is copied exactly from an examination written for the Minnesota Examining Board by a recent graduate of one of our older and well established schools. Comments appear quite unnecessary excepting that license was of course refused, and that as every examining board member knows, such cases are not rare.

On total of three arithmetic problems which any pupil who has finished the eighth grade work should have solved, his answer was marked as zero for each of the three.

In response to question on history, "What do the stars and stripes of the U. S. flag represent?" his answer, quoting exactly, was "Libatory, when George Washington gained the independence for the United States."

In response to the question, "Name the capital cities of the thirteen original states," he answered: "St. Paul, Minnesota; Springfield, Ill.; Pear, South Dakota; Bismark, North Dakota."

In response to the question, "Name the martyred presidents of the United States," he answered, "Willison" (Evidently Wilson).

His total rating on all common school subjects was 17.5 on a basis of 100.

In response to question calling for a letter of not less than fifty

words and not more than one hundred words, subject of letter to be "Report on Illegal Veterinary Practitioners in Your Locality," he answered:

Candidate No. 129.

"St. Paul, Minn., July 13, 1915.

"Minnesota State Veterinary Exam, Board.

"Dear Sir.

"As I am practicing at.....and am practicing Veterinary Medicine, I find that their is a quack at.....sixteen miles south which is doing work and making charges. for his servis. It would be grate pleasure to me a grate help if the Minnesota State board would tend to this matter.

(Copied exactly)

In 1904, less than 20% of our American Medical Colleges required more than full high school course for matriculation. In 1911, 33% required one or more years of collegiate work. Later figures are not available.

PRESIDENT MARSHALL: Gentlemen, you have heard the report. What is your pleasure?

DR. KINSLEY: I move that the report be accepted and referred to the executive committee. Seconded by Dr. Hoskins.

PRESIDENT MARSHALL: Any remarks to be made in regard to referring the report of the committee on colleges to the executive committee? If not those in favor make it manifest by saying "aye"; those opposed "no". Carried. It is so ordered. That finishes the program for the morning. Before we adjourn, let us fix the time for meeting in the morning. It is scheduled at 9:30. The executive committee has a good deal of work to do yet. I think if you make it ten o'clock that the executive committee will be ready to report at that time.

If there is no objection, we stand adjourned until ten o'clock to-morrow.

Oakland, Calif., September 2, 1915.

The fifth business session of the fifty-second stated meeting of the American Veterinary Medical Association was called to order by the President, Clarence J. Marshall, at ten o'clock A. M.

PRESIDENT MARSHALL: Gentlemen, the executive committee is still in session. They won't be through for half or three-quarters of an hour, but in order to start the meeting on schedule time we will not wait for the committee. They will report later.

The first thing on the program this morning is the report of Dr. Hoskins, Secretary of the Special Committee on Salmon Memorial.

Dr. Hoskins then read the report of the committee as follows:

SALMON MEMORIAL COMMITTEE.

Mr. President and Members:

Having accepted at your hands the post of secretary of the Salmon Memorial Committee and in that capacity having communicated with the other members of your appointment, as well as the reviewing of the extensive communications on this subject that brought forth expressions of favor from representatives of a large proportion of the state associations, some local veterinary organizations, the Bureau of Animal Industry, national organizations, as well as a number of the local branches of this body, with many expressions of individual interest, and a wealth of suggestions, all showing the deepest interest in perpetuating this good man's name, all of which have been considered by your committee, we beg leave to present for your consideration the following suggestions:

First: that the Salmon Memorial Fund shall be undertaken by this body and that a stated committee will be appointed by this organization for the carrying out of the purposes of this movement.

Second: that the form of testimonial shall be of an educational character, that may cover a scholarship, a fellowship, or some advanced or special work of interest or import to the veterinary profession, as may from time to time be recommended by this committee for action of the association.

That to this end a sum of monies of not less than ten thousand dollars be raised by popular subscription from the upwards of seventeen thousand of veterinarians in North America; this money to be invested under the direction of this association so that the income of four or five hundred dollars may be annually awarded to some one or more along the lines above referred to.

That said scholarship or fellowship shall be in an American Veterinary College, and if a fellowship, not to be taken in the college of which the successful person awarded the same shall be a graduate thereof.

To this end, Mr. President, I am authorized by a committee of Pennsylvania Veterinarians to guarantee the sum of five hundred dollars from that state or one-twentieth (1-20) of the sum of any amount that may be determined upon.

I am equally assured by representatives of the New York State Associations that they will raise the sum of five hundred dollars.

Many other states have already raised sums of monies for this purpose and some states are endeavoring to secure a contribution from each practitioner in their respective states.

Monies already contributed are in the hands of a number of state custodians waiting some specific action by this body.

I have here a telegram saying that the Ohio Association voted one hundred dollars for the Salmon Memorial.

Respectfully submitted,

W. HORACE HOSKINS, Secretary.

(See the October 1915 number for a more extended report).

PRESIDENT MARSHALL: Gentlemen, you have heard Dr. Hoskins's report. What do you wish to do with it? Is there any discussion? This is an important matter and I hope you will discuss it thoroughly, and that some definite plan will be offered. If any of you wish to speak on the subject, I will be very glad to hear from you.

DR. MURPHEY: Mr. President, that kind of a memorial appeals to me very much. It seems to me a permanent committee should take it in charge, not only to secure the subscription, but also to decide upon the sort of fellowship to be given along with representative lines of work; not necessarily the same kind of work every year, and not necessarily the same school, but that the matter should rotate and that the investigation work provided for should be done under the masters which we have in this country. I think that one of the greatest handicaps to veterinary education in this country has been the lack of fellowships for students who do not have the ability or means to pay for their own sustenance during the time the work is being done.

DR. HOSKINS: Mr. Chairman, the committee deemed it wise to leave the form which the memorial might take, entirely to the recommendations of the association, to be taken up from year to year by the association, and not to recommend any one specific line whatever; for instance, Dr. Murphey might come in and make a recommendation to the association that would be referred to that committee to investigate, and the following year the work could be carried on in that direction if so desired.

I think there should be the widest latitude as to what is the best way. It might be that some young man, a son of a veterinarian, whose father might be sending him through school, might come to the second year without funds, and it might be that \$200. or \$300. would help that man through, so we think the committee ought to have the widest latitude in this respect. Naturally we have received a great many suggestions from all over the country in respect to this memorial. Some have advocated a memorial statue, or a memorial arch, or something of that kind, but that sort of memorial did not appeal to the committee whatever. It did not seem to be in accord with the wonderful life which Dr. Salmon led, and the wonderful work which he did. It seemed to the committee that if he had had the planning of it, it would be something along the line to advance veterinary education, and we believe the committee should work in that direction.

PRESIDENT MARSHALL: I would like to ask Dr. Hoskins if the committee worked out any plan for a permanent committee, so that the different organizations throughout the country should be combined into an efficiently working whole.

DR. HOSKINS: No, Mr. Chairman, we did not work out any plan, but I have one in mind, and if the incoming administration should see fit to assign me to a place on that committee, I should take up the labor with the keenest delight and pleasure.

As I said in my tribute to him, I have spent thirty-five years of my life in close touch with the man, and a better man never lived in our country.

We have numerous committees already who are taking up this matter with great enthusiasm, and they are waiting now for some concrete directions from this body. Some have gone ahead and done work and collected money, but I have asked them to postpone any definite action as to how the money should go until this body should act and make some general plan.

DR. TYLER: The Doctor in his last few remarks touched upon the very point I wish to refer to. Some little time ago the Southern Auxiliary of the California Association received a communication from a coterie of veterinarians, I believe, from Boston, Massachusetts or somewhere in the East, asking for a contribution to this fund. Well, we did not know what we ought to do, but our secretary was instructed to notify the gentleman who did the writing that when the matter took a concrete form we were ready to remit. I do not think that condition is confined to our society alone. I think it holds good in others, and it is my judgment that it will be necessary to have some permanent committee—somebody to whom the money shall be sent, and who will see that it is properly spent. We stand ready to contribute to this fund to the very best of our ability.

DR. FOX: Speaking in behalf of the California Association—The Northern Association, our association also received a communication similar to the one Dr. Tyler has just mentioned. A resolution was passed, after we received this communication, and we advised the person who wrote the letter that we would lend our moral support as soon as the time came when a permanent committee was in charge of this movement, and that we would also lend our financial support, and so we have been waiting, as have many others, until we knew that the committee had been appointed by this body to take charge of the matter and see that the fund raised is properly handled. You may expect hearty co-operation from the California Association.

DR. RUTHERFORD: Mr. President, although I do not belong to the United States, I feel that this association and the members of the veterinary associations generally, not only in North America, but throughout the world, owe it to themselves as well as to the late Dr. Salmon to perpetuate his memory in a fitting and becoming manner. Dr. Salmon was the man who put into concrete form and rendered possible the effective Organization of Veterinary Sanitary Service of Meat Inspection in the English speaking world. He was the first man who brought order out of chaos in that connection. His work has been a model from which subsequent work of a similar character has been planned and carried out. Speaking for myself, I may say that had it not been for the great work which has been already done by Dr. Salmon, at Washington, the task of attempting to organize a Veterinary Sanitary Service of Canada and the Meat Inspection Service of the country would have presented greater

obstacles—almost unsurmountable obstacles which would have rendered the work which has been done along that line in Canada much more difficult and unquestionably, when completed, much less perfect. I feel satisfied that the very best way in which the name of Dr. Salmon can be perpetuated in the veterinary profession is that which has been suggested by Dr. Hoskins. We have already seen that method practiced in the old world, as well as in the new. And again, we have seen statues erected and pictures hung commemorative of great men, but these are local, and after one generation has passed—perhaps even before one generation has passed,—the great bulk of the people who were interested in the career of that man, have lost touch with his memory. Having a Salmon Memorial Scholarship, or Fellowship, and having a Salmon Memorial Fund, which will be known and recognized through the world, the memory of Dr. Salmon will be kept green and fresh, not only in the minds of those who knew him, but in the minds of all those who are to come. I therefore take very much pleasure in moving that the memorial to the late Dr. Salmon take the form as suggested by Dr. Hoskins as chairman of the temporary committee. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: The motion has been made and seconded that the suggestions made and read by Dr. Hoskins, chairman of the temporary Salmon Memorial Committee, be adopted as suggested by him.

DR. FAUST: Mr. President, I would like to state that at a meeting of the New York State Veterinary Society a committee was appointed with power to work in conjunction with the committee that should be appointed by this association.

PRESIDENT MARSHALL: Any others to speak on this question? Personally I have received letters from a number of different people interested in this question and it is the general feeling that the national association should take the lead in concentrating the work of this memorial. I would be very glad to see the recommendations of the committee accepted.

All those in favor of the acceptance of the recommendations as made by the committee, make it manifest my saying "aye". Those opposed "no". Carried. It is so ordered.

Now, as I understand the recommendation there is no definite way settled upon for the selection of that committee. Is it to be elected or appointed? Would it be well to have it stated how this committee should be selected?

DR. HOSKINS: Our committee felt about that, Mr. Chairman, that we ought to leave that to be determined by the body and not make any specific recommendation.

I do believe, Mr. President, that if the resolution is adopted along the line we propose the committee ought to be a committee appointed or elected for five years. That when charged with that duty it might require five years for the committee to get the sum required but it would be possible to report each year, how much money was available and let the association make such recommendations as it might see fit. I believe that committee ought to have some degree of permanence.

(To be continued)

FROM THE OFFICE OF THE SECRETARY OF THE A. V. M. A.

Table showing the proportion of alumni of various colleges with respect to membership in the American Veterinary Medical Association.

Name of College	No. Alumni	No. Members	% Members
San Francisco Veterinary College	198	74	37 plus
Univ. of Pennsylvania, Vet. Dept.	628	181	28 plus
New York State Vet. Col. at Cornell	370	103	27 plus
Washington State Vet. College	69	17	24 plus
Iowa State Vet. College	309	60	19 plus
Alabama Polytechnic Vet. College	82	15	18 plus
Colorado Veterinary College	68	12	17 plus
U. S. College of Vet. Surgeons	247	42	17 plus
Kansas City Vet. College	1311	202	15 plus
Indiana Vet College	541	79	14 plus
Ohio State Univ., Vet. Dept.	527	76	14 plus
Cincinnati Vet. College	284	38	13 plus
St. Joseph Vet. College	145	13	8 plus
Grand Rapids Vet. College	467	23	4 plus
Michigan Vet. College	13	0	0 plus

The number of alumni of the following colleges who are members of the American Veterinary Medical Association has been compiled from the records of the secretary of the above association. The total number of alumni of these colleges has not been obtained.

College	No. Members in the A.V.M.A.	College	No. Members in the A.V.M.A.
Ontario Veterinary College.....	383	St. Joseph Vet. College.....	13
Chicago Veterinary College.....	290	Colorado Vet. College.....	12
Kansas City Veterinary College..	202	Ohio Vet. College.....	10
Univ. of Pennsylvania, Vet. Dept.	181	Laval University	10
New York City, (Various Colleges)	156	Detroit Col. of Med., Vet. Dept.	8
McKillip's Veterinary College..	114	M. R. C. V. S. London.....	8
New York State Vet. Col., Cornell	103	Terre Haute Vet. College.....	8
Indiana Vet. College.....	79	Columbia University.....	7
Ohio State Univ., Vet. Dept.....	76	National Vet. College.....	6
San Francisco Vet. College.....	74	M. R. C. V. S. Glasgow.....	5
Iowa State Vet. College.....	60	M. R. C. V. S. Edinburgh.....	5
Montreal Vet. College.....	55	Veterinary School of Berlin....	5
U. S. Col. of Veterinary Surgeons	42	California Univ., Vet. Dept.....	4
Cincinnati Vet. College.....	38	Stuttgart Univ.	2
Harvard Univ., Dept. of Vet. Med	31	New Vet. College.....	2
Geo. Washington Vet. College...	25	Vet. College, Tokio.....	2
Grand Rapids Vet. College.....	23	National Vet. College, France...	2
Washington State Vet. College...	17	Royal Vet. College, Copenhagen.	2
Kansas State Ag. Col., Vet. Dept	16	Various Vet. Colleges represented	
Alabama Poly. Inst., Vet. Dept.	15	by one member.....	17

TO QUALIFIED VETERINARIANS

Detroit Meeting Are you planning to be present at the meeting of the American Veterinary Medical Association to be held in Detroit, August 21, 22, 23, 24, and 25? All veterinarians of good reputation who are graduates of recognized colleges are cordially invited to attend this meeting. The convention will probably be the largest meeting of veterinarians ever held and the program will excel any hitherto given.

Program Several papers of exceptional interest have already been selected. The clinic will be a special feature this year and will occupy the entire day. Operations on carefully selected cases will be supplemented by lectures and demonstrations, and it is proposed to conduct a question box and open discussion in conjunction with the clinic.

Entertainment On account of the day of entertainment to be provided by Parke, Davis Company, it has been necessary to extend the time of meeting to include Monday, August 21st. In addition to the meeting and clinics there are many attractions in Detroit of special interest to veterinarians. The Local Committee of Arrangements is perfecting plans to enable the visiting veterinarians and their families to enjoy these to the utmost.

Improve Your Practice If you are meeting with success in your practice you cannot afford to miss this convention. The association includes most of the successful practitioners in the United States and Canada. In fact, it is the largest veterinary organization in the world.

Get Out of Your Rut If you are not entirely satisfied with the size of your practice or your present location you certainly should go to the Detroit meeting where you will have the opportunity to meet your colleagues from widely separated fields, get new ideas from personal acquaintances which may open opportunities for advancement and wider practice.

Keep Up With Your Profession If you are unable to attend the Detroit Convention, you may still have the privilege of reading the proceedings as published in the Journal of

the American Veterinary Medical Association which comes out each month to all members of the association in good standing. This Journal, formerly the American Veterinary Review, and recently purchased by the association, has been enlarged and improved. No veterinarian, whether practitioner or inspector, can afford to be without it. In order to retain the confidence and respect of the modern stock-raiser, it behooves every veterinarian to keep right up to the minute on the discussion and developments and discoveries that are new in his profession.

Inquire For literature and information concerning the American Veterinary Medical Association, address the Secretary, C. M. Haring, University of California, Berkeley, California.

CHANGE OF ADDRESS

	OLD	NEW
Becker, Chas. J.	Scottboro, Ala.	To 108 Jefferson Co. Savings Bank Bldg., Birmingham, Ala.
Cleveland, W. J.	Galt, Ia.	" Havelock, Ia.
Curtis, W. A.	Plainview, Tex.	" Bureau of Agriculture, Manila, Philippines
Davis, L. B.	827 E. Girard Ave., Philadelphia, Pa.	" Twin Oak, Clementon, N. J.
Earl, W. B.	1113 E. 11th St.	" 3741 Broadway, Kansas City, Mo.
Graff, P. L.	Rolla, N. D.	" Bisbee, N. D.
Krieger, Robt. E.	Ray, N. D.	" Williston, N. D.
Lapple, Edw.	23 Fed'l Bldg., Kansas City, Kans.	" 132 Exch. Bldg., Sioux City, Ia.
Lombard, C. M.	Stock Yards, Chicago, Ill.	" 4502 Emerald Ave., Chicago, Ill.
Lothe, Herbert	Sharon, Wis.	" Waukesha, Wis.
McDonnell, L. E.	Hankinson, N. D.	" Audubon, Minn.
McFarland, C. M.	217 Fed'l Bldg., Spokane, Wash.	" 230 Exch. Bldg., Sioux City, Ia.
Mitchell, A.	Manila, Philippines.	" 3d Field Artillery, Ft. Sam Houston, Tex.
Rich, T. S.	Pueblo, Col.	" 1477 W. Grand B'l'vd, Detroit, Mich.

SOCIETY MEETINGS

THE COLORADO VETERINARY MEDICAL ASSOCIATION

The Colorado Veterinary Medical Association held its annual meeting at the rooms of the Gentlemen's Riding and Driving Club in Denver, Colorado, on January 18th. It was attended by the largest number of Colorado veterinarians which have attended any previous meeting.

One important item of business was the apparent oversight of the law makers in leaving the veterinarian out of consideration in formulating the prohibition measure which went into effect on January 1st. Apparently under the law the veterinarian has the same right to obtain alcohol or any alcoholic substance that any other citizen has, but is not given the special consideration which is extended to physicians. A committee was appointed to consult with the Attorney General on the matter in order that relief might be had. Six new members were elected.

Dr. A. P. Drew, President of the Association, took up the matter of "Milkweed Poisoning in Cattle", a disease which has become quite prevalent in the vicinity of Grand Junction. He gave details of a number of cases where it was quite apparent that poisoning had been due to this weed (*Asclepias verticillata*). He had sent a considerable quantity of the weed to the Experiment Station where alcoholic, glycerine and watery extracts have been made and tested on rabbits without any evident results. Not only did this disease seem to affect cattle but was also supposed to kill sheep.

Dr. G. C. Lamb gave a very interesting discussion of the proceedings of the U. S. Live Stock Sanitary Boards, and the special meeting called by Secretary Vrooman to consider foot-and-mouth disease.

The paper entitled "Sundries", which brought out a discussion of Azoturia and of ulcers of the intestine of dogs due to streptococci, was given by Dr. C. W. Dickey.

"Sanitary Police Control of Hog Cholera" was given by Dr. R. H. Bird. He advocated much more stringent measures on the part of the state sanitary authorities in controlling hog cholera, and pointed with pride to the results of such control in the San Luis Valley.

Dr. Lamb, State Veterinarian, being present admitted that more control was needed in order to eradicate the disease, but he

contended that the impetus must come from the hog raisers themselves, and that they must take an active interest in the matter if any permanent results were to be secured. He pointed out that the eradication of the disease in the San Luis Valley was due to the efforts of the growers themselves rather than any regulations made by the state.

Dr. C. C. Stewart discussed "A Pneumonic Condition in Young Calves" in his district, giving the symptomatology and asking for more information.

"Perforated Bowel in the Horse" was discussed by Dr. A. P. Drew, and accompanies this communication. (See Case Reports.)

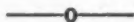
Dr. V. J. Ayers discussed some unusual cases that had occurred in his practice.

Dr. J. D. Paxton had a paper on a peculiar disease of hogs which the members present were unable to diagnose.

The election of officers resulted as follows:

F. D. Hylton, Longmont.....	President
L. R. Dillon, Pueblo.....	1st Vice-President
T. H. Quinn, Greeley.....	2nd Vice-President
I. E. Newsom, Ft. Collins.....	Secretary-Treasurer

The next meeting will be held about the first of June at Fort Collins.



MISSOURI VALLEY VETERINARY ASSOCIATION

The semi-annual meeting of the Missouri Valley Veterinary Association held in Kansas City, Mo., February 1st, 2nd, and 3rd, was marked by an unusually large attendance and a program of scientific interest and practical value. About 170 members and 200 visiting veterinarians registered, in addition to a large number of students from the Kansas City and St. Joseph Veterinary Colleges. Thirty-one new members were added to the roll.

The scientific program was as follows:—"Why the Horse Has Colic More Often Than Other Animals", by C. L. Wilhite; "Some Legal Phases of Veterinary Practice", by D. M. Campbell; "Equine Laminitis", by R. C. Moore; "Poisoning of Animals", by N. S. Mayo; "Greater Accuracy in Clinical Diagnosis", by R. R. Dykstra; "The Anatomy of Cryptorchids", by S. L. Stewart; "Some Things That Happen to Serum Producers and Serum Users", by E. K. Glover; "Kansas City's New Milk Ordinance and how it Operates", by W. H. Phipps; "Observations on the Treatment of Jacks

and Jennets", by Stanley Smith and H. C. Carver; *Neerobacillosis in Pigs*", by S. W. Alford; *"Hemorrhagic Septicaemia"*, by Chas. Murray; *"Hemorrhagic Septicaemia in the Form of Mad Itch"*, by J. T. Brown; *"Does Infectious Pneumonia (Swine Plague) Exist in this Country"*, by A. T. Kinsley. Case reports and general discussions of the papers presented added much to the interest and value of the program.

The third day was devoted to the clinic and a splendid demonstration of bovine splanchnology by S. L. Stewart. A specially prepared subject was used in which all important visceral structures were demonstrated by electric illumination and their positions and surgical and physiologic importance explained by appropriate remarks. Clinical cases were handled by Drs. Jos. Hughes, J. S. Anderson, J. V. Lacroix and others. An interesting demonstration of a new rectal injection appliance was given by Dr. O. B. Morgan. This syringe is inserted and held in place by exhausting the air from within the rectum, the same negative pressure serving to inject water into the bowel. The apparent advantages of the appliance lie in the simplicity of its operation, the safe degree of pressure applied and its automatic retention. From 10 to 12 gallons of water can be injected into the average horse.

During the regular session a resolution urging the passage of the Lobeck Bill upon members of Congress and another commending the plan for preparedness of the veterinarians of the United States for military service, as presented to the association by Dr. R. Vans Agnew of the 5th U. S. Cavalry, were adopted.

R. F. BOURNE, Secretary.

THE ALABAMA VETERINARY MEDICAL ASSOCIATION

The ninth annual meeting of the Alabama Veterinary Medical Association was held at Auburn in the Veterinary Department of the Alabama Polytechnic Institute February 18th and 19th. There were twenty-five veterinarians present, mostly from Alabama, and seventy veterinary students, a number of agricultural students and a few farmers.

President Andrade in his address called attention to the fact that Alabama has made considerable progress in the last year by securing the passage of a Veterinary Practice Law. He also reviewed the progress of the veterinary profession in general.

The first paper read was that of Dr. W. W. Webb on abortion.

In speaking about the causes of abortion Dr. Webb stated that many of the cases enumerated in the text books were rarely if ever factors in the production of abortion. He seemed inclined to think that infection and mechanical injuries of various kinds covered the greater number of causes of abortion.

The next paper was that of White and Williams on White Diarrhea in Chickens. The paper considered the coccidian variety and also the more troublesome type due to bacterium pullorum. This paper was a review of the literature on the subject and presented nothing new or original.

Dr. C. W. Ferguson gave the anatomical reasons why solipeds are more subject to colic than other domestic animals. This paper led to a somewhat spirited discussion of the technical definition of colic.

King and Harget read a paper on the toxic effect of black locust on domestic animals. They first gave a review of the literature on the subject and then gave results of their experimental tests upon horses and cats. The toxalbumen found in the bark of this tree is soluble in ten per cent solution of salt and when given to an animal dissolved in this strong salt solution some of the purging action that may be attributed to the toxin may be due to the salt. This was especially brought out in the effect of the drug upon a cat. Some one stated that this toxalbumen affected animals similar to belladonna. This is doubtful except for one or two things. It appears to dilate the pupil but its action on the heart appears to be entirely different from that of belladonna.

Dr. Geo. R. White gave an illustrated stereopticon lecture on cryptorchids. The illustrations and the explanations were very plain and thoroughly enjoyed by the members of the association.

Dr. O. R. Eatman next reported a fatal case of volvulus of the small intestine.

Dr. L. E. Beckham reported several cases of parturient paresis where the affected cows failed to get down yet were cases of this disease; they made a rather speedy recovery.

Dr. I. S. McAdory reported a case of injury of the external part of the radial region in which there was rupture of the popliteal and possibly the posterior radial arteries. He illustrated this case by using the limb of a "sub" to show the parts affected.

Dr. C. C. Middleton reported a case of intestinal calculus and presented the broken calculus to the meeting. He stated that the

animal passing this calculus had been fed on some sugar feed and it appeared that the calculus was made up of deposits of crystallized sugar about a small central stone. The calculus was turned over to the veterinary department for analysis to determine its composition.

Dr. T. B. Gissendanner reported a case of low tenotomy. He stated that the separated parts of the tendon had failed to unite.

Dr. L. F. Pritchett gave a short paper on the chief characteristics of Bursati. He seemed to think that a diagnosis of Bursati could be made by the peculiar odor that is associated with it, its recurrence in the animal, being confined to the skin and subcutaneous tissue and its temporary disappearance or subsidence during cold weather. He gave no permanent remedy but suggested that excision of the affected parts as often as possible might keep it down. Dr. White suggested in the discussion that the application of equal parts of tincture of iodine and chloride of iron would remove the kunkurs and infection at a given place but that it was liable to return in some other part of the body.

Dr. J. R. Readon gave a synopsis of government inspection of serum plants.

On the night of February 18th the Veterinary Medical Association of the Alabama Polytechnic Institute entertained the Alabama Association at a banquet. At this banquet there were about 150 in attendance and to say the least, it was one of the most enjoyable features of the meeting.

On February 19th the whole day was devoted to a polyclinic. Dr. Geo. White was chief operator, doing more operating than any other veterinarian present. He castrated three colts standing, one mule in the recumbent position, operated on one cryptorchid boar, one boar with scrotal hernia and spayed one bitch. He also used his restraining apparatus on nearly all the animals operated on with the exception of one that was placed upon the Simplicity Operating Table. That case was tenotomy of the deep flexor tendon in a four year old stallion, the operation being done by C. A. Cary. A number of cases of lameness were presented to the veterinarians present who made diagnosis and recommended treatment. Some of the cases presented were navicular arthritis, side bones, gonitis and one of the interesting cases presented was a fracture or dislocation of the atlas and axis in a roan horse. The surprising feature of this case was that the animal was living, carried his head to one side but was unable to move the neck with any degree of safety. This case was discussed at length.

The veterinarians making examinations, diagnoses and suggesting treatment were Doctors Middleton, Howle, Lambert, Beckham, Eatman, Andrade, Gissendanner, Kearley, Cook and others. A very interesting case presented itself in the midst of this clinic by the appearance of a darkey with a three year old colt that had a choke in the thoracic part of the esophagus. This choke was due to the animal bolting cowpeas in the hull. A rubber tube was passed by Dr. McAdory, locating the choke in the thorax. In all there were about twenty cases presented for the polyclinic.

The officers elected for the ensuing year were: President, Dr. R. I. Kearley, Andalusia, Alabama; Vice President, Dr. L. E. Beckham, Tuscaloosa, Alabama; Secretary-Treasurer, Dr. C. A. Cary, Auburn, Alabama.

C. A. CARY, Secretary.



VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY
(December Meeting)

The regular monthly meeting of the association was called to order by the President, Dr. H. D. Gill at 9 p. m.

The minutes of the November meeting were read and approved.

The secretary read a letter from Mr. Augustus S. Downing regarding the new registration act.

Dr. W. H. Hoskins of Philadelphia, Pa., was introduced and gave a very interesting address on the operation of the veterinary law in Pennsylvania. He stated that thirty-nine states now have veterinary laws and hopes that in the near future a federal certificate will be recognized by all the states throughout the union thereby enabling one holding such certificate to practice in any state. In doing this some states whose laws are quite severe would have to modify the same to some extent.

These remarks of Dr. Hoskins were well received as they brought out many instructive points regarding the operation of veterinary law in Pennsylvania.

The question was asked "What makes a dog dream happy dreams?"

Dr. Hirschler gave it as his opinion that this condition is due to impressions of the mind similar to that same condition in children, who often in their sleep will reenact their play and sports.

A number of the members discussed this subject citing different cases relative to the same.

The secretary and treasurer's report was then read. The auditing committee examined the records and certified the same. This report was, on motion, unanimously received, and ordered placed on file.

Dr. Hoskins at this time spoke of the Salmon Memorial Fund and eulogized the late Dr. Salmon in the highest terms. He spoke of his being a Cornell student and later of his twenty-five years service as chief of the Bureau of Animal Industry which he organized and directed.

He explained that at the last meeting of the A. V. M. A. it was decided to raise a fund of ten thousand dollars with which it is proposed to establish a memorial which will probably be of an educational nature, in the form of a scholarship or fellowship for deserving veterinary students or for research work in animal diseases.

There are thirteen thousand veterinarians in the United States and if each would contribute a dollar it would be more than enough for this worthy object. Dr. J. G. Rutherford of Canada, is a member of the A. V. M. A. committee and is taking up the work in that country.

This being the annual meeting the election of officers for the ensuing year then took place and resulted in the following gentlemen being elected: George J. Goubeaud, President; A. Silkman, Vice President; Robert S. Mac Kellar, Secretary and Treasurer.

Dr. Gill the retiring president thanked the association in a few well chosen words for the honor conferred and the support given him during the past year.

Dr. Goubeaud was then installed as president and also thanked the association for the honor, and asked for the cooperation and support of every member to make the coming year a success.

Under new business Dr. McKinney brought up the subject of fake remedies and mentioned one in particular which had recently been brought to his attention.

Dr. Hoskins said that the best way to combat this evil is to analyze the so called remedy and publish the formula. Action can also be taken by the district attorney on the charge of mislabeling.

Two or three good papers were promised for the February meeting.

No further business appearing the meeting adjourned.

ROBT. S. MACKELLAR, Secretary.

(January Meeting)

The regular monthly meeting of this association was called to order by the President elect, Dr. Geo. J. Goubeaud at 8:45 p. m.

The roll of members was called and change of addresses noted.

The minutes of the annual meeting held in December were read and approved.

The president announced that he had appointed the following gentlemen to act as a prosecuting committee, Dr. R. W. Gannett, Chairman, Dr. D. W. Cochran, Dr. Wm. J. McKinney.

Dr. Gannett as chairman said that the committee had held two meetings and arrived at the conclusion that there is a great deal of illegal practice going on and think it best to secure the services of a detective to obtain evidence in these cases.

The prosecuting committee up to the present time have received voluntary contributions amounting to a considerable sum.

Dr. Gill stated that the question of financing the committee should be carefully considered and suggested that a fund should be raised for this purpose.

It was moved by Dr. Geo. H. Berns that the prosecuting committee be authorized to solicit funds from legally registered practitioners—seconded and unanimously carried.

The privilege of the floor was at this time extended to the visitors present.

Dr. Kornobis spoke of the advisability of working in harmony with the State Board of Education in all matters of prosecution.

Dr. Griessman said he was pleased to hear that the prosecuting committee proposed to obtain the services of a detective agency for the purpose of obtaining evidence.

Dr. Berns also endorsed this method of obtaining evidence.

Dr. Gannett stated that he had the assurance of the Assistant Attorney General that he would bring action when evidence was presented.

Dr. McKinney moved that the prosecuting committee be empowered to employ a detective to obtain evidence—seconded by Dr. Berns.

There was quite a lengthy discussion of this motion and Dr. Chase offered as an amendment to Dr. McKinney's motion that the prosecuting committee be empowered to employ a detective to assist them in obtaining evidence against illegal practitioners and that payment for such services shall be made out of a fund raised by the prosecuting committee—seconded and carried.

The motion as amended was then adopted as a whole.

The prosecuting committee stated that a full report of all transactions would be rendered to the association:

Dr. William Gall of Matawan, N. J., and Dr. David McAuslin of Brooklyn, N. Y., were proposed for membership and ordered referred to the board of censors.

Dr. Griessman spoke of revising the by-laws for the purpose of allowing different forms of membership in the association such as associate and fellow members.

Dr. Chase moved that a committee be appointed to revise the by-laws—seconded—not carried.

Dr. McKinney moved that a certain sum be given the prosecuting committee out of the treasury. This motion was seconded but not carried.

The answer of the Internal Revenue Department regarding the matter of P. Harvey Flynn was read by the secretary—ordered acknowledged and placed on file.

A letter from Dr. J. G. Wills, chief Veterinarian of the Department of Agriculture in answer to the letter addressed to the Commissioner of Agriculture regarding the list of approved veterinarians was also read, ordered acknowledged and placed on file.

Resolutions endorsing the work of Dr. Charles Duncan in Autotherapy and recommending him for the Nobel prize in medicine were, on motion, by Dr. Corwin—duly seconded and unanimously carried.

Dr. Duncan who was present sincerely thanked the association for the action taken in this matter.

Dr. Geo. J. Goubeaud then read an article he had prepared entitled the "Illegal Practitioner".

The doctor went into this subject very thoroughly and in an emphatic and convincing manner.

Dr. Louis Griessman then read an interesting paper on "The Use of the X-Ray in Veterinary Medicine", and exhibited a large number of photographs of normal and pathological conditions.

The president appointed the following gentlemen to serve as a board of censors: Dr. D. W. Cochran, Chairman; Dr. Geo. H. Berns, Dr. Max. Danziger, Dr. Thos. E. Corwin, Dr. P. Burns.

The following gentlemen were also appointed to serve as a judiciary committee: Dr. Thos. E. Corwin, Chairman; Dr. W. Reid Blair, Dr. Chas. E. Caulfield.

A unanimous vote of thanks was tendered Drs. Goubeauld and Griessman for their contributions to the programme of the evening.

No further business appearing, the meeting adjourned.

ROBT. S. MACKELLAR, Secretary.

MICHIGAN STATE VETERINARY MEDICAL ASSOCIATION

The meeting of the Michigan State Veterinary Medical Association was held at Lansing, February 8 and 9. After the meeting was called to order by President Erwin an address of welcome was delivered by Mayor Reutter and responded to by J. P. Hutton. This was followed by the president's address after which there were reports from resident secretaries, standing and special committees.

In the evening there was a banquet presided over by Toastmaster C. C. Mix. The following took part in the speech-making: President F. L. Kedzie, subject, "M. A. C."; Mayor Reutter, subject, "Lansing"; G. W. Dunphy, "Responsibilities"; Reuben Hilty, "A. V. M. A."; H. H. Halladay, "Michigan"; Judson Black, "The Veterinarian"; H. L. Schuch, "Qualifications"; H. M. Gohn, "Our Duties"; J. S. McDaniel, "Anything"; J. H. Blattenburg, "Ohio"; W. R. Harper, "The Farmer".

On the 9th there were papers and discussions on surgery and surgical operations; the new veterinary law; the handling of contagious diseases throughout the state, etc. Drs. W. J. R. Fowler of Toronto, G. W. Dunphy, J. Black, N. S. Mayo and others took part.

The 1916 officers and board of directors of the Michigan State Veterinary Medical Association were elected as follows:

President, Geo. W. Dunphy.....Lansing
First Vice President, F. M. Blatchford....Brighton
Second Vice President, A. B. Curtice.....Hillsdale
Third Vice President, J. S. McDaniel....East Lansing

BOARD OF DIRECTORS

H. M. Gohn, St. Johns.....Six Years
G. D. Gibson, Adrian.....Five Years
J. P. Hutton, East Lansing.....Four Years
H. M. Armour, Chelsea.....Three Years
Judson Black, Richmond.....Two Years
A. McKercher, Lansing.....One Year

The officers and board of directors constitute the executive committee.

Owing to the fact that the 1916 A. V. M. A. meeting will be held at Detroit the Michigan Association will hold no mid-summer meeting, as every effort will be put forth to make the A. V. M. A. meeting a most successful one.

Our annual meeting was exceptionally well attended and one of the best the association has ever held.

W. AUSTIN EWALT.

HUDSON VALLEY VETERINARY MEDICAL SOCIETY

The last meeting of this Society was held at the Hotel Lincoln, Hudson, N. Y., February 2, 1916.

The meeting was called to order by the President, Dr. Comstock. There were about 20 members present. After the regular routine business had been gone through, the disease influenza was discussed.

The members present entered heartily into the discussion. It seemed to be the consensus of opinion of those present that the use of phylacogen and the use of the various vaccines were of very little use. Some of the members reported some very interesting cases; namely, one veterinarian reported losing as high as 22 out of 24 horses, and on post mortem examination in each and every case a condition of the liver was found similar to those of horses which have been used for the production of diphtheritic antitoxin.

Others reported peculiar instances where the structure of the kidneys had been broken down.

It seemed to be the consensus of opinion of the veterinarians present that the treatment of influenza in this locality should be largely stimulants and good hygiene.

It was also brought out in discussion that influenza oftentimes appears differently in different localities.

It was voted to hold the next meeting at Poughkeepsie, when the disease discussed will be indigestion.

The meeting was adjourned, and after adjournment there was a banquet held in the dining room of Hotel Lincoln.

WM. HENRY KELLY, Secretary.

THE IDAHO ASSOCIATION OF VETERINARY GRADUATES, BLACKFOOT, IDA.

Our meeting would have had better attendance if the weather had permitted, but it was a good one as the spirit was present if not the body.

We had quite a lengthy discussion on the *Taenia Fimbriata* in sheep along with the Foot and Mouth disease by Dr. Robert Dill of the B. A. I. There were also papers given by Dr. Freeman, Dr. Williams, Dr. Smith and Dr. White.

Our meeting for this year was held at Drs. White & Williams Veterinary Infirmary, Blackfoot, Idaho, on February 4th and 5th. The next meeting of the association will be held at Boise, Idaho, on the same dates for the year 1917.

The following officers were elected: E. E. McDaniels, D. V. M., St. Anthony, President; R. P. Smith, D. V. M., Wendell, Vice President; C. V. Williams, D. V. M., Blackfoot, Secretary; J. H. Plank, D. V. M., Rupert, Treasurer.

C. V. WILLIAMS, Secretary.

COMMUNICATIONS

SALMON MEMORIAL FUND

Editor Journal of the American Veterinary Medical Association:

If not encroaching too much upon your valuable space, I would like to offer a few words in commendation of the work of the committee on the Salmon Memorial fund, and to urge the hearty co-operation and support, (not only of the members of the American Veterinary Medical Association, but of the entire American veterinary profession) of the active and untiring efforts of the secretary-treasurer of that committee, that indefatigable worker, Dr. W. Horace Hoskins. His carefully prepared and energetically executed plans are bearing fruit in a most encouraging manner. His plan of securing one hundred subscribers at twenty-five dollars each has progressed so well, that he has launched his second plan, calling for two hundred and fifty subscribers of ten dollars each. Of course there is no limit to the number who may subscribe in either class, but the doctor wants at *least* to reach the goal which he has set as the *minimum*, when he probably would make a third appeal to a still larger class, for a smaller amount each. And, while but five months remain between now and the time of the Detroit meeting, still, if every member of the profession will but rally to the support of the committee *now*, to whatever extent they feel able, the committee will be in a position at the Detroit meeting to report the fund raised, and take counsel with the association as to how best to invest it so as to have it earn the annual amount required for the scholarship to a student of veterinary medicine or fellowship to a veterinarian, as explained in the letter recently sent out from the secretary-treasurer's office of the Salmon Memorial Committee,

Ten thousand dollars has been estimated by the committee as the minimum amount required to insure an income sufficient for the foregoing plans; and surely it should be possible to raise that amount if the veterinary population of North America, (seventeen thousand) has been correctly estimated by the committee, or even if there are only half that number.

But what should be borne in mind by the profession is, that *prompt response to the call* is going to be a tremendous assistance to the committee in carrying out this work that has been assigned them by the national organization. A man's *intentions* may be the very best, but his *subscription* means that his part in assisting in the work has been *done* and the committee can check him off and direct its efforts elsewhere.

I do not think for a moment that the "cause" needs any boosting, especially with the members of the veterinary profession whose privilege it has been to have known the late lamented Daniel Elmer Salmon during any part of his more than a quarter of a century's service as a federal officer in the interests of the livestock industry and a pure food supply in this country.

They know what Dr. Salmon's broad-gauged capability and moral fibre have done for the uplift of the profession. They fully appreciate the effect that his modest demeanor and fine personality has had in impressing the American public with what constitutes a veterinarian. No man can measure the full extent of the uplifting influence of such an one, as our representative for twenty-five years at the head of the veterinary service in the United States Department of Agriculture.

These men have honored him while he lived by electing him to the highest office in the gift of the American veterinary profession: that of president of the American Veterinary Medical Association, which he dignified, and filled to their entire satisfaction. They will feel it a *privilege* now that he has been taken from them by death (at an age when they had every reason to believe he should have remained with them for many years more), to participate in an act that is to immortalize his name. A reminder, however, that now is the time to avail themselves of that precious privilege, may not be out of order. For a number of years prior to Dr. Salmon's death, he was engaged in the work of establishing a veterinary school, and in veterinary educational work in Uruguay, South America, during which time and since, hundreds of new members of the profession have joined our ranks; and it is to them that I would like to address a few words of appeal to *get themselves in line* in this commendable object, that they may *share* with their older confreres, the privilege of being participants in honoring the name of a man that they should feel proud to refer to as having been a member of *their* profession. It has been my privilege to know personally this great man, whose name had been

familiar to me since my earliest association with matters veterinary. Even before I had joined the ranks of the profession, in my early days as a student, I used frequently to hear the name of Daniel Elmer Salmon from preceptor and professors, always respectfully and earnestly referred to; that being at the very inception of the U. S. Bureau of Animal Industry of which he was the first chief; and later it was my privilege to enjoy a personal friendship with him. While many of our younger members can never have the privilege referred to, they may still avail themselves of subscribing to the fund that is to keep his name green down through the generations that are to come. Just how *great* a privilege that is, they can gauge by the very high esteem in which Dr. Salmon has been held by his professional brothers during all his lifetime amongst them and the reverence with which his memory is held by them to-day. The thought of a memorial to the name of Dr. Salmon sprung up in Massachusetts among the loyal members of his profession there, and was then taken up by the American Veterinary Medical Association, and thereby given a *national* aspect; which is most fitting, as Dr. Salmon's work, and uplifting influence was never less than nation-wide.

It is the writer's opinion too, that the *form* of the memorial proposed—being educational in character—will strongly appeal to the younger generation of veterinarians who have been launched into the profession on the ship of higher education. Personally I regard as a peculiarly fitting testimonial to the name of a man who had by his life-work, exerted such an uplifting influence upon his profession, a memorial that shall, while perpetuating his memory, at the same time perpetuate his educational and uplifting influence upon the members of his profession that come after him in the succeeding generations.

Very sincerely yours,

ROBERT W. ELLIS.

FROM BRAZIL

The following extracts are taken from a personal letter received from an old member of the A. V. M. A., Dr. J. A. McNeil, chief veterinarian for the Brazil Land, Cattle and Packing Co., Sao Paulo, Brazil.

"I have had an experience with the foot-and-mouth disease here. As a constant thing it is not pleasant to deal with. The cattle are of such small value that the ranchers and breeders do little or nothing to treat it, or prevent its spread.

"In all the Latin-American countries where I have ever been, the Urubu (Buzzard) is the bird of paradise, and they carry all kinds of disease from ranch to ranch—a God-send that they have them, I presume, as they keep many of the villages or cities habitable. They clean up both front and back yards for them—but you know what they are from experience. You are no doubt aware that the

condition in all these S. A. countries does not appear to be as rosy as before the outbreak of the war in Europe, as the governments are in poor financial circumstances.

"To my mind conditions have been wildly exploited; Kabel, Brice, and the host of writers have grossly misrepresented things, even Teddy in his series of articles in Scribner's is not consistent. He insists that all that region at 10° and north to the equator, or that part through which he traveled, will in time be a great farming and stock raising country, still the country is so destitute and barren that they can hardly get through with pack mules and oxen, (no grasses), and hosts of pests, screw worms, ticks, etc. From my four years here I would not care to do any pioneer work in that region, it is not a place for white men.

"The matto, or wooded land there, as here, is really all that is of any account, and on account of such heavy rainfall and heat the brush must be cut out each year and your land or farm reclaimed, almost an endless job. You will probably think that I have dipped my pen in the aloes bottle, but I would not have my friends think that this country is an Eldorado or promised land. Of all the books on Brazil and S. A., the late lamented Joe Wing's book "In Foreign Fields" is the best it has been my pleasure to read. He hits the nail on the head almost every time; some few things I cannot agree with him in, but in all essentials he is sound. My observations have not been as extensive as his, but in some sections I have made up in length of time. His advice relating to the American farmer and laborer is mighty good. I have seen many clean-cut Americans, English, and Germans tramping through this country—absolutely no work for them to do, and the labor proposition here is something frightful—no good. But enough of this.

"I hope the A. V. M. A. will have a well attended meeting at Detroit this year. Hardly think it possible that I will return by that time, as I want to stop in the Argentine for several months after leaving here.

"We are still living in Parana Stata, and hope we can maintain this residence for several months yet. It gets pretty hot here, and all things are not quite as we would like to have them. This climate is much better than Matto Grasso in which to live; i. e. (for the white man). We have nearly all of the pure bred cattle here, although ultimately all will go, or be sent, to Matta Grasso as the most of the land owned by the company is in that state. I have some mighty fine Hereford and Shorthorn calves grown in this country. The young, especially the late calves fever badly. The earlier born ones, June, July and August seldom fever in a fatal form, and do not suffer from Dermotobia Noxalis, as do many born late in the season."

N. S. M.

REVIEWS

A TEXT-BOOK UPON THE PATHOGENIC BACTERIA AND PROTOZOA

JOSEPH MCFARLAND, M.D.

Professor of Pathology and Bacteriology in the Medico-Chirurgical College,
Philadelphia.

Eighth edition, thoroughly revised. Octavo of 807 pages with 323 illustrations,
a number of them in colors.

Philadelphia and London: W. B. Saunders Company, 1915. Cloth \$4.00 net.

Although bacteriology and protozoology are comparatively new sciences, they have developed in so many different directions that it is no longer possible to prepare a text book that adequately covers the entire field. Bacteriology has found its way into such a variety of human activities that the student of human medicine, veterinary medicine, dairying, agronomy, sanitary science and certain of the industries, each require a treatise containing in addition to the general technique, classifications and principles of bacteriology, certain definite information about microorganisms immediately associated with their respective subjects. While there is considerable overlapping the subject matter to be specifically dealt with in each instance is quite different from that in any of the others.

Dr. McFarland has developed a text book on the subject of bacteriology, including certain pathogenic protozoa, that is of unusual interest and value to the student of human medicine. This eighth edition contains 40 well defined chapters. The ones on structure and classification of microorganisms, biology of bacteria, infection and immunity are exceptionally well presented, although the subject matter of the others is well arranged and clearly stated. In a subject so large and so rapidly developing as bacteriological technique, there is opportunity for differing with any author. While exceptions may be taken to certain of the methods set forth in this volume, it is doubtful if, on the whole, a better selection could be made.

In separate chapters the bacteria of each of the specific infectious diseases of man are carefully described and in many instances very well illustrated. Among these are such diseases as tuberculosis, glanders and actinomycosis that are of special interest to the veterinarian. The chapter on tuberculosis takes up the preparation of tuberculin and gives a somewhat complete description of the bovine and avian varieties of tubercle bacteria. He also discusses in this connection a number of the acid fast bacteria that are more

or less liable to be mistaken for those of tuberculosis. The protozoa are restricted to those pathogenic for man.

The organic structure of the book is highly commendable. The style is clear and the space devoted to the various topics is well proportioned. In selecting data from the vast literature on this subject the author has exercised keen discriminating power and presented only that which seems to be of the most importance. The references to the literature are not numerous but sufficient for a text book. The illustrations are good, well chosen and instructive.

This book has had a phenomenal growth due undoubtedly to the care with which each successive edition has been written. It has unfolded the new developments of the science and its application for the medical student. It has now become somewhat large for a text book, yet one fails to find paragraphs that could well be omitted. Its fullness, however, is an advantage especially when it is used by competent teachers.

There are a number of minor points on which opinions may differ as to the interpretation of the phenomena and in certain instances slight changes suggest themselves. However, these are in connection with topics that are as yet more or less controversial. As the author is a teacher of high standing, the subject matter is presented in a manner adapted to the needs of medical students. It is difficult to suggest how a greater number of important bacteriological facts could be more fully and concisely presented. Although the book is written primarily for medical students it contains a great volume of information on the role bacteria play in nature's economy. It is to be highly commended to students and practitioners of human medicine and others interested in the subject of medical bacteriology. The author is to be congratulated. The publishers have done their part in making it an attractive volume.

V. A. M.

News has reached us of the death of the wife of Dr. C. Douglas McMurdo at Fort Huachuca. She was horseback riding with the Doctor and was suddenly stricken, fell from the horse and when reached by the Doctor in about five seconds, was dead. She had suffered from heart disease for some time. She was a devoted mother to their three children and much esteemed at the various posts where the Doctor had been stationed in his long career in the Army Veterinary Service.

MISCELLANEOUS

The state of Alabama recently dedicated a \$25,000 laboratory for making serum and virus for the treatment of hog cholera at Auburn.

Dr. Malkmus, of the Hanover Veterinary School, is at the front with the army. He, in 1913, was the first to bear the title of Rector of the school. Prof. Dr. Frick has succeeded him to the title.

Dr. Aquila Mitchell, formerly in the Philippines, is now stationed with the 3d Field Artillery, Fort Sam Houston, Texas.

Dr. J. V. Prucha of the Bureau of Animal Industry, stationed at Cleveland, Ohio, has been transferred to Denver, Colo.

The next meeting of the North Carolina Veterinary Medical Association will be held June 21 and 22 at Wrightsville Beach, N. C. The State Board Examination will be held June 20, 1916.

The mid-winter meeting of the Montana Veterinary Medical Association was held at Bozeman, Montana the last of January. Dr. F. S. Gray of Great Falls, was elected president; Dr. A. J. Dufrene of Glendive, vice-president; and Dr. A. D. Knowles of Missoula, secretary-treasurer.

The short course for veterinarians at the University of Minnesota opened with an attendance of 40. Dr. D. S. White of the Ohio State University and Dr. F. F. Brown of Kansas City were scheduled for lectures.

The next meeting of the Southern Illinois Veterinary Medical and Surgical Association will be held in August, 1916 at Centralia, Ill. Much interest and enthusiasm is shown and the association is growing rapidly.

Among the recommendations of the Medical Health Officer of Vancouver, Canada, is one that all meat intended for human consumption be inspected by a government veterinary inspector. Another is that all private slaughter houses be abolished and all cattle intended for consumption be sent, on the hoof, to a public abattoir, where they may be thoroughly examined before and after killing by a properly qualified government veterinary inspector, because, with the organs removed it is difficult to determine the condition of health.

Bulletin 102, of the Georgia State College of Agriculture of Athens, Ga., announces a Veterinary Degree Course. Freshman and sophomore work of a four-year course, leading to the degree of

D.V.M. is now offered for the first time. By the time students have completed the freshman and sophomore work the purpose is to offer the complete course.

THE SALMON MEMORIAL FUND. It is estimated that it will require about three years to raise the \$10,000 planned as the principal of this fund. While it is hoped that the balance may be raised this year, anyone so desiring may make his contribution payable in two installments, a portion payable this year and the balance in 1917.

CURRENT REPORT

Brownell's Dairy Farmer states that the address of Dr. W. L. Williams on "Contagious Abortion in Dairy Cattle," delivered to an audience of Michigan livestock breeders, has attracted widespread attention.

The dogs of the Army hospital service have had a hospital provided for them in Jena, Germany and already a number of dog patients have been treated there for wounds and various ailments. The hospital was built by convalescent soldiers. So far during the war dogs have rescued at least 3000 wounded soldiers who otherwise would have perished.

It is reported that as the law now stands Wisconsin farmers will not be paid, after this year, for animals reacting to the tuberculin test.

Roy C. Whitsell of the Indiana National Guard has been appointed veterinarian of the field artillery battalion.

It has been recommended that public watering troughs in Pittsburgh be closed for a time on account of the presence of glanders in horses.

The death of Emil Meyer, formerly a veterinarian, is reported to have occurred at the Lebanon hospital New York City in March.

There is a bill pending in the Lower House of the Legislature of Mississippi requiring the state veterinarian to make his headquarters at Jackson, Miss.

The Rockefeller Foundation has granted an additional endowment of \$1,000,000 needed in connection with the Department of Animal Pathology at Princeton, N. J.

Dr. Blattenberg, with an interpreter, planned to accompany Dr. C. J. Marshall on his European trip to study veterinary conditions in the war camps in England and France.

VETERINARY MEDICAL ASSOCIATION MEETINGS

In the accompanying table the data given is reported by many Secretaries as being of great value to their Association, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list:

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y
Alabama Vet. Med. Ass'n..	1916 Feb. 18-19	Auburn	C. A. Cary, Auburn
Alumni Ass'n College of Vet Med. O. S. U.....		Columbus.....	W. R. Hobbs, care O. S. U., Columbus, Ohio.
Alumni Ass'n, N. Y.-A. V. C	1916	141 W. 54th St.	P. K. Nichols, Pt. Richmond.
Alumni Ass'n U. S. Coll. Vet Surgeons	April 15, 1916..	Wash., D. C....	C. M. Mansfield, Wash., D. C.
American V. M. Ass'n.....	1916 Aug. 22-25	Detroit, Mich...	C. M. Haring, Berkeley, Cal.
Arkansas Veterinary Ass'n.	1916	Little Rock....	R. M. Gow, Little Rock
Ass'n Médécalle Veterinaire Française "Laval".....	1st and 3d Thur of each mo.	Lee. Room, La-Val Un'y, Mon.	J. P. A. Houde, Montreal
B. A. I. Vet. In. A., Chicago.	2d Fri. each mo.	Chicago	Chas. E. Schneider, Chicago.
B. A. I. Vet. In. A., S. Omaha	3d Mon. each mo.	S. Omaha, Neb..	E. J. Jackson, So. Omaha.
Buchanan Co. Vet. Ass'n...	Monthly	St. Joseph.....	F. W. Caldwell, St. Joseph, Mo.
California State V. M. Ass'n	June 14, 1916..	Los Angeles....	F. M. Hayes, Davis.
Central Canada V. Ass'n....	Feb. and July..	Ottawa	A. E. James, Ottawa.
Central N. Y. Vet. Med. Ass'n	June and Nov..	Syracuse	W. B. Switzer, Oswego.
Chicago Vet. Society.....	2d Tu. each mo.	Chicago	D. M. Campbell, Chicago.
Colorado State V. M. Ass'n	June, 1916....	Fort Collins....	I. E. Newsom, Ft. Collins.
Connecticut V. M. Ass'n....	1916	Greenwich	A. T. Gilyard, Waterbury.
Delaware State Vet. Society	Jan. Ap. Jul. Oct	Wilmington	A. S. Houchin, Newark, Del.
Essex Co. (N. J.) V. M. A....	1d Mon. each mo	Newark, N. J....	J. F. Carey. E. Orange, N. J.
Genesee Valley V. M. Ass'n		Rochester	O. B. Webber, Rochester.
Georgia State V. M. A.....	1916	Savannah	P. F. Bahnsen, Americus.
Hamilton Co. (Ohio) V. A....			Louis P. Cook, Cincinnati.
Hudson Valley V. M. A....		Hudson	W. H. Kelly, Albany.
Idaho Ass'n Vet. graduates.	1917, Feb. 4-5..	Boise	C. V. Williams, Weiser
Illmo Vet. Med. Ass'n.....	1916	E. St. Louis....	L. B. Michael, Collinsville, Ill.
Illinois State V. M. Ass'n...	1916	Chicago	L. A. Merillat, Chicago.
Indiana Veterinary Ass'n....	1916	Indianapolis	A. F. Nelson, Indianapolis.
Iowa Veterinary Ass'n.....	1916	Des Moines.....	H. B. Treman, Rockwell City.
Kansas State V. M. Ass'n...	Jan. 2-3, 1917.	Wichita	J. H. Burt, Manhattan.
Kentucky V. M. Ass'n.....	Oct. & Feb....	Lexington	Robert Graham, Lexington.
Keystone V. M. Ass'n.....	2d Tu. each mo	Philadelphia	Cheston M. Hoskins.
Lake Frie V. M. Association	Pending	Pending	Phil. H. Fulstow, Norwalk, O.
Louisiana State V. M. Ass'n	1916	Lake Charles ...	Hamlet Moore, N. Orleans, La.
Maine Vet. Med. Ass'n....	1916	Augusta	H. B. Westcott, Portland.
Maryland State Vet. Society		Baltimore	H. H. Counsellman, Sec'y.
Massachusetts Vet. Ass'n...	1th Wed. ea. mo.	Young's, Boston	E. A. Cahill, Lowell, Mass.
Michigan State V. M. Ass'n	1916	Lansing	W. A. Ewalt, Mt. Clemens.
Minnesota State V. M. Ass'n		St. Paul	G. Ed. Leech, Winona.
Mississippi State V. M. Ass'n	1917 Jan. 10, 11	Clarksdale	E. S. Norton, Greenville.
Mississippi Valley V. M. Ass'n	Semi-Annually	Galesburg, Ill..	G. E. McIntyre, Alexis, Ill.
Missouri Valley V. Ass'n...	1916 Feb. 1, 2, 3	Kansas City, Mo.	R. F. Bourne, Kansas City, Mo.
Missouri Vet. Med. Ass'n...	1916	St. Louis.....	Chas. D. Tolse, Kansas City.
Montana State V. M. A....	1916 Jan. 28, 29	Bozeman	A. D. Knowles, Missoula
Nat'l Ass'n B. A. I. Employees	1916	New York, N. Y.	S. J. Walkley, 185 N. W. Ave., Milwaukee, Wis.
New York S. V. M. Soc'y...	1916 Aug. 2-4..	Ithaca	C. P. Fitch, Ithaca, N. Y.
North Carolina V. M. Ass'n.	1916, June 16..	Wrightsville Beach, N. C..	J. P. Spoon, Burlington.
North Dakota V. M. Ass'n...	1916 July	Fargo	W. J. Mulroony
North-Western Ohio V. M. A.	1916	Toledo	Paul E. Woods, Ottawa
Ohio State V. M. Ass'n.....		Columbus	F. A. Lambert, care O. S. U., Columbus, Ohio.
Ohio Soc. of Comp. Med.....	Annually	Upper Sandusky	F. F. Sheets, Van Wert, Ohio.
Ohio Valley Vet. Med. Ass'n			J. C. Howard, Sullivan.
Oklahoma V. M. Ass'n.....	Fall, 1916....	Omaha City....	C. E. Steel, Oklahoma City.
Ontario Vet. Ass'n.....	1916	Toronto	L. A. Wilson, Toronto.
Pennsylvania State V. M. A.			T. E. Munce, Harrisburg